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PEEPS INTO THE HUMAN HIVE.

VOL. II.

PEEPS INTO THE HUMAN HIVE.

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BEES;" "CURIOSITIES OF TOIL," ETC.

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PEEPS INTO THE HUMAN HIVE.

SEWING MACHINES, ENGLISH AND AMERICAN.

THE invention of machinery to take the place of merely mechanical labour, within the last century, has produced surprising results. The mere waste of human muscle before the invention of the steam-engine was no doubt prodigious. The building of the great pyramids of Egypt must have cost thousands of lives from mere exhaustion, not one of which would have been lost had these gigantic works been built in the present era. From the rougher manual labour, the ingenuity of the mechanic has proceeded to invade the more delicate hand-labour of the artisan; spinning and weaving machines have given way to the spinning-jenny and the power-loom, and now the last operation—the sewing together of the fabrics thus woven by the power-loom—has given place to the mechanical needle-woman, the sewing machine.

As early as the beginning of the present century, many attempts were made to produce an instrument of this kind, and an analogous machine—one to embroider and do tambour-work—was successfully used in this country. As the demand for articles of this nature depended much upon fashion, as soon as a new mode set in, these machines were thrown aside and forgotten. It must be remembered, however, that many of their parts form portions of the present sewing machine, the eye-pointed needle especially. But the adaptation of these parts to the first practical sewing machine was undoubtedly brought about by a New York mechanic, Elias Howe, who in 1846 took out a patent for this ingenious and, as it proved, most important machine. He does not appear to have offered it to his own countrymen at first—at all events it was not first set to work in America, for we find Howe brought his machine to England in the September of that year, when he offered it without showing it to Mr. Thomas, of Cheapside, a stay manufacturer, for five hundred pounds, and ultimately he took two hundred and fifty pounds for an implement which has for many years since brought him in fifty thousand a-year in the United States alone for royalties—such is the difference between a power "in esse" and "in posse." It is but right to state that the original machine, although containing most of the movements it now possesses, was very imperfectly finished; consequently, it did not make a great success at first—indeed, it was abandoned for three years, and it was not until half of the patent time had elapsed that it was brought into commercial use in England. On Howe's return to America, however, many improvements were made upon the original machine, and it at once took its place as a great invention. In England it was not until the patent rights of Mr. Thomas expired that the public ever heard of it. Immediately upon the expiration of this term, some years ago, the numerous varieties of this machine patented in America came into use here. These machines are adapted for various purposes—some being fitted for heavy manufacturing work, others for mere domestic purposes. The manufacturing machines are known as the shuttle machines; they are sometimes very large in size—indeed, they may be termed engines, inasmuch as they are adapted for work that can only be successfully accomplished by the aid of steam. The Singer sewing machine, and the Howe and the Thomas, are all made of gigantic proportions, and the noise of the spool, or shuttle, running to and fro is quite as great as that of the power-loom. The heaviest harness-work and sail-making work is performed by these machines with speed and perfection.

The introduction of the sewing machine was most vehemently opposed by the trades unions of the various trades it affected; in fact, it was the old story of the power-loom versus the hand-loom over again. When the history of trades unions is written, it will be found that the sewing machine has had a very powerful effect in breaking down the restrictive nature of these unions, where, indeed, it has not abolished them altogether. During the strike of the tailors in London, the sewing machine made great way in the construction of all clothes; and doubtless it will do away with much skilled manual labour in the future: possibly it will be the first step in the abolition of "the ninth part of a man"—a change by no means to be lamented, inasmuch as it is an unmanly employment. In all the great Government clothing establishments of Europe, the machine has for some time been employed. At the Royal Army Clothing Factory at Pimlico, and at the Woolwich factory, the Thomas sewing machine, driven by steam, has been in use for several years. Here great sub-division of labour exists; one garment having to go through, perhaps, a dozen machines adjusted to do different kinds of work. It is by this sub-division, which enables each machine to work without any fresh adjustment, that the greatest economy and saving is experienced. Captain H. B. Hawes, of the Pimlico factory, in his report to Government upon the working of sewing machines, gives the following comparison between the time taken to make a pair of trousers by machine and by hand, showing a gain of nearly four hours:—

	By Machine.	By Hand.	
	Min.	Hours.	Min.
To seam the pocket facings	2	.. 0	10
„ stitch the pocket facings, two seams	5	.. 0	40
„ seam the pocket bearers	2	.. 0	8
„ seam the four long seams	6	.. 1	15
„ make the fly	2	.. 0	8
„ seam the button fly	1	.. 0	6
„ stitch the button fly.............	3	.. 0	25
„ seam the waistbands	6	.. 0	18
Forward........	27	3	10

	By Machine. Min.		By Hand. Hours.	Min.
Brought forward	27		3	10
To stitch the waistbands	6	..	0	30
„ stitch in the fly	2	..	0	12
„ make the back straps	4	..	0	25
„ put on the back straps	4	..	0	10
„ join the trousers	2	..	0	15
	45		4	42

For merely domestic work, the very well known machine, which has not the disadvantage of the noise of the shuttle, and which makes the lock-stitch, the strongest of all, is the most advantageous.

The value of the sewing machine to the seamstress in a health point of view is by no means the least important item in the matter. The use of the feet in giving motion to the treadles supplies that exercise to the lower extremities, the want of which produced so much sickness in the needlewomen of old. The variety of motion and attitude where the machine is used is also very valuable, and the act of sewing, as now carried on in our large establishments, is no longer the unhealthy employment depicted so vividly in Hood's "Song of the Shirt." And it may be truly said to have improved the condition of the worker pecuniarily as well as healthfully. There are no poor creatures slaving for four shillings a week at shirt-making. Machinery here, as in many other kindred occupations, has benefited the worker, at the same time that it has reduced the value of the articles sewn, to the public. Boot and shoe-making has for many years been accomplished by the aid of the sewing machine. In most of the cottages in the neighbourhood of Northampton, the not unmusical click of the sewing machine is to be heard. The introduction of this machine has so cheapened the cost of manufacture, that boots and shoes are now to be obtained cheaper than they ever were, notwithstanding the increase that has taken place in the cost of living and in the rate of wages. The same may be said of our clothing; never was this necessary of life cheaper than at the present moment. In America their use is much greater than in England; no respectable house is without its machine. Large companies are employed in making sewing machines at a very low rate by automatic machinery, which turns out the different parts with such perfect accuracy that they may be made interchangeable with those of other machines at will. The saving of wages in the United States by the use of these machines is very large; the wages of a seamstress there is at least fifty cents per day. Now, as one worker with the machine can do as much as five women, the saving is very great. As far back as the year 1863, it was asserted at the Society of Arts that "the aggregate annual saving to the United States effected by the sewing machines with the present number (three hundred thousand) in use, is upwards of twenty-nine million pounds; or, in other words, if the whole of the machine sewing now produced in America were to be performed by hand, it would require a sum of upwards of twenty-nine million pounds per annum to pay for the extra labour which would have to be employed."

As the sale of sewing machines has more than quadrupled since the date on which this paragraph was written, we may guess what the saving is to our cousins across the water at the present time.

It may perhaps be objected to the use of these machines, which find thought as well as action for the worker, that they will have a tendency to lower his intelligence. This is, however, but a superficial view of the matter. The artisans who have intelligence, be they male or female, are not likely to have it stimulated by mere textile ingenuity. When machinery is made to paint pictures, to chisel sculpture, then, and not till then, will it be possible to assert that it can have any ill effect even upon the intelligence of special arts.

A machine, with its complicated parts, will at all times demand greater intelligence upon the part of the worker than the simplest of all implements, the sewing-needle. We know well that the introduction of the drilling-machine, the digging-machine, and the many other elaborate agricultural implements, have demanded a higher class of intelligence on the part of the hands working them, than did the plough and the spade of old; and the sewing machine will equally stimulate the intelligence of those who are employed in the art of sewing, now they have no longer to depend upon a mere bit of steel requiring only a little clever and quick manipulation.

We may take it for granted that the more complicated the tools of the workers, the higher must be the level of their intelligence, where the work to be done is of a mere routine character. We make this reservation of course, as, where the mind is mainly employed, the character of the tool is nothing. Phidias, for instance, with the commonest chisel in the world could produce better work than the mere monumental mason with the finest machines and appliances ever invented.

It will be long, however, before the sewing machine can call up such poetical ideas as a woman sewing has done. A great American writer on the subject, Nathaniel Hawthorne, author of "The Scarlet Letter," and "The House with the Seven Gables," says:—"There is something extremely pleasant, and even touching—at least, of very sweet, soft, and winning effect—in this peculiarity of needlework, distinguishing women from men. Our own sex is incapable of any such by-play aside from the main business of life; but women—be they of what earthly rank they may, however gifted with intellect or genius, or endowed with awful beauty—have always some little handiwork ready to fill the tiny gap of every vacant moment. A needle is familiar to the fingers of them all. A queen, no doubt, plies it on occasion; the woman poet can use it as adroitly as her pen; the woman's eye, that has discovered a new star, turns from its glory to send the polished little instrument gleaming along the hem of her kerchief, or to darn a casual fray in her dress. And they have greatly the advantage of us in this respect: the slender thread of silk or cotton keeps them united with the small, familiar, gentle interests of life, the continually operating influences of which do so much for the health of the character, and carry off what would otherwise be a dangerous accumulation of morbid sensibility. A vast deal of human sympathy runs along this electric line, stretching from the throne to the wicker chair of the humblest seamstress, and keeping high and low in a species of communion with their kindred beings."

It would be easy to write an essay upon the moral effects of the substitution of the sewing machine for the common needle. Every house that possesses one may be said to have a willing Puck ready to do his services nimbly and effectually, without destroying the temper of the worker, and very often her health into the bargain. We all know how the simple drudgery of making a set of shirts at home in the olden time was apt to render the wife's temper irritable, and to dull her spirit for weeks; but now the willing and nimble machine has nearly banished this source of annoyance from our houses. Machinery is plentiful enough in factory labour; let us be thankful that ingenious men have done something to sweeten the domestic life, and to brighten the family at home. There is but one wearisome employment which even the so-called good housewife turns to with disinclination at the last moment, and that is—mending stockings. Inventors to the rescue! Can none of you manage an implement to darn stockings?

THE POST-OFFICE.

Perhaps no greater test could be given to the industrial and commercial progress of the nation than a reference to the history of the Post-office since it has been established amongst us. It is one not only of our commercial, but of our educational advancement, as far as that can be tested by the power and inclination to write letters. As long as there was no public post in existence, the relations of the mass of Britons extended no further than their own towns or villages, where any communications they required to make were made orally. Under such circumstances letter-writing was unnecessary. The rich and powerful could send written messages, but the expense of each missive was such that this class only could afford the cost of special messengers. In the time of Edward the Second there were horses kept for hire by private individuals along all the great roads and in the large towns, and by means of these relays private letters were forwarded at the pace horses could travel along the ill-made roads of that period. The king's letters rode "haste post haste," of course, and on special occasions they made good progress. Thus it is related that, when Edward the Fourth was pursuing his Scottish wars, he established relays of horses, twenty miles apart, from York to Edinburgh, which conveyed his messages two hundred miles in three days. But such arrangements were never conceived to be possible for the public, and letters, when sent, took months by the pack-horse method of conveyance between even London and Bristol. In the reign of James the First the first letter-post was established by the Government to foreign countries, but the internal correspondence was not thought worthy of consideration. In the next reign, however, the people were becoming a power in the state, and a Post-office for inland letters was established by Charles the First. In his proclamation he "commands his postmaster for foreign parts to settle a running post or two, to run night and day between Edinburgh and London, to go thither and come back again in six days, and to take with them all such letters as shall be directed to any post town in or near the road." As feeders to this great northern line, bye-posts were established to great towns lying on either hand. A branch to Chester and Holyhead, to command the Irish line, was established, and of course there was another branch to the then second city in the kingdom, Bristol, which was carried as far down west as Plymouth. Thus, before the Revolution, the great channels of inter-communication were sketched out. The postage charges were not very high, considering the expense of conveyance. A single letter was carried eighty miles for twopence, a hundred and forty miles for fourpence, the length and breadth of England for sixpence, and into the uttermost parts of Scotland for eightpence.

The carrying of letters was from the first a royal monopoly. The revenue speedily increased; at the commencement the postmaster was permitted to take the profits, in consideration of his paying the charges. When it was seen that it was a paying department, the postmaster's office was farmed, a practice which was continued for a long time. Parliament, in the reign of Charles the Second, re-enacted the settlement made under the Commonwealth, and this act is considered the charter of the Post-office. The increase of the business of the office may be measured by the fact, that in 1663 the profits were farmed at twenty-one thousand pounds a year, that sum being settled on the king's brother, James, Duke of York. Towards the latter end of the seventeenth century the system of internal posts was settled by the establishment of lines of roads, thus filling up the main outlines established by Charles the First. The London District Post was a private venture, set on foot by an upholsterer named Robert Murray, and was made over by him to William Dockwra. The penny post was so great a success, that the Government seized it as an infringement upon the royal monopoly. In 1685 the Post-office was farmed for sixty-five thousand pounds a year, which was settled upon the king and his heirs for ever. Dockwra was, however, appointed the controller of the penny-post department, which was kept distinct from the General Post Office; but in the year 1698 he was dismissed with a pension.

Among other reasons for his discharge from his office, it was alleged that " he forbids the taking of any band-boxes (except very small) and all parcels above a pound, which, when they were taken, did bring in considerable advantage to the Post-office, they being now, at great charge, sent by porters into the city, and coaches and watermen into the country, which formerly went by penny-post messengers much cheaper and more satisfactorily." It surely must be an error that "band-boxes" and parcels above a pound in weight were carried for a penny. If this was so, it was a far more economical arrangement than our " parcel post " of the present day. Imagine a postman carrying, in addition to his ordinary letters, a dozen band-boxes containing cocked hats out as far as Islington for a shilling. It is quite clear that there must have been an idea abroad that the district Post-office was a great field for enterprise, as we find that, in 1708, an attempt was made to establish a halfpenny post, but it was suppressed by a lawsuit. All this time, indeed up to the year 1720, the cross-posts were very imperfectly organised, and the consequence was that places out of the ordinary roads were very seriously delayed. One Ralph Allen, of Bath, proposed to remodel the system, and managed to procure from the Government a lease of the system for his life for six thousand pounds a year. This was a lucky venture, inasmuch as he lived for forty years after his bargain, and so managed to improve the "bye-posts," that he made an annual profit of twelve thousand pounds. He thoroughly deserved it, however, as he conferred an immense benefit on the country districts, and spent his gains upon works of charity, and in princely hospitality and patronage of men of letters. The city of Bath, where he lived, keeps his name in perpetual remembrance. In 1799 the Bye-Letter Office, as it was called, was abolished, and its functions were absorbed into the General Post-office. In the year 1763, when the chief office was in Lombard Street, the establishment was on a very small scale as compared with its present dimensions. The whole establishment of clerks did not number two hundred, whereas at the present moment it is more than two thousand five hundred. A few New York, Harwich, and Dover sailing boats—not more than fifteen in all—carried the whole foreign and colonial mails of the country, whereas now a splendid fleet of steamers are under contract to carry the mails at an annual charge of eight hundred thousand pounds.

In the year 1784 it was found necessary to curtail the privileges accorded to members of both Houses of Parliament, of receiving and sending letters free of payment through the post. It was before that time the practice to frank scores of these letter-covers, for the use of friends by the mere member's signature; even servants obtained them from their masters in any numbers, and sold them; they were forged very largely—so much so, that the revenue was estimated to have lost by the abuse a sum of one hundred and seventy thousand pounds annually. It was afterwards enacted that the whole superscription must be in the handwriting of the member, but even this restriction did not prevent the abuse of the privilege, as every middle-aged man can well remember; and we have no doubt that the members themselves were glad that the privilege, to them a very great nuisance, was wholly abolished when the great reform of post-office management took place in 1840.

Although coaches were running through the whole of the country from as early a date as the middle of the seventeenth century, as we learn by advertisements in the papers of that date, yet, strange to say, it never occurred to any one until the year 1783 to carry the mail bags by them. In that year a Mr. Palmer, of Bath, the manager of the theatre,—this city seemed to possess the monopoly of post-office reformers,—submitted a scheme to Mr. Pitt, for the better dispatch of letters. In this scheme he drew a most dolorous picture of the method in which letters were then conveyed. He says, "The post at present is almost the slowest conveyance in the country, and though, from the great improvement in our roads, other carriers have proportionately mended their speed, the post is as slow as ever. It is likewise very unsafe, as the frequent robberies of it testify; and to avoid a loss of this nature, people generally cut bank-bills at sight in two, and send the bills by different posts. The mails are generally entrusted to some idle boy without character, mounted on a worn-out hack, and who, so far from being able to defend himself, or escape from a robber, is much more likely to be in league with him." The advantages of coach conveyance were not overlooked by the public, as we are told that when any letter was required to be carried with speed, it was packed up in brown paper, and, thus converted into a parcel, was legally and safely conveyed to its proper destination. Outsiders could see that what was good for parcels was equally good for letters, but the Post-office people had subsided, as they do periodically, into a state of lethargy, and would not move out of their old official groove. But Pitt was not the minister to let a good idea drop; he appointed Palmer Controller-General of the Post-office, with a handsome salary, together with an allowance of two and a half per cent. upon an excess in the net revenue of two hundred and forty thousand pounds. Mr. Palmer at once raised the speed of the mails, by putting them upon four wheels, from three and a half to more than six miles an hour. An immediate increase in the correspondence of the Post-office was the result of this reform by an outsider. But the Parliament, ever jealous of any revolutionary inroad upon ordinary officialism, suspended Palmer from his functions, and after having realised his ideas, gave him a pension much below what he was entitled to under his agreement, and it was not until he had struggled for redress twenty years that his wrongs were relieved by a Parliamentary grant of fifty thousand pounds.

At the end of the century the postage of inland letters was raised, the scale being settled at a minimum of threepence, and a maximum of ninepence;

and the dead officialism of the office again establishing itself, the scale became still heavier, until the whole system toppled over by its own weight in 1840. But there was still another reform to take place in the speed of conveying letters. Coaches had supplanted post-boys, but the roads were still heavy, and a rate of six miles an hour for his Majesty's mail gave room to great improvement. This improvement was furnished this time by Mr. Macadam, a Bristol gentleman, who so far mended the high roads by a system now known by his name, that the mails were accelerated to ten miles an hour. A macadamised road was opened in the year 1818, but in twelve years' time the road of iron supplanted for the first time every other means of conveyance, and the ten miles an hour was changed, by the opening of the Liverpool and Manchester line, to between thirty and forty miles an hour.

In the year 1829 the General Post-office was removed from Lombard Street to the present fine building at Saint Martin's-le-Grand. Before the establishment of railways, one of the sights of London was to witness the departure of the evening mails from the yard of the Post-office. The well-horsed coaches started one after another in gallant style, amid a crowd of sightseers that never seemed to decrease from one year's end to the other. But Stephenson was at work, and gradually His Majesty's Mails gave place to the mail-van, and the glory of the exits of the Royal Mails now seems like a thing of the distant past. The era of revolution had set in with a vengeance. In 1836 the stamp duty, threepence-halfpenny upon newspapers, which put a clog upon the liberty of the press, was reduced to one penny, and the result was that a perfect deluge of these public instructors nightly gorged the post-office bags. One innovation speedily followed another, and the post officials must have thought there was to be no more peace in their time. In the year 1839 Rowland Hill startled them by a proposal to reduce the postage to one penny for any distance. His plan was most vehemently opposed by the authorities, but the House of Commons investigated the matter, approved the idea, and it was put in practice at the beginning of the following year. From this date all the old traditions of the Post-office were buried. Sir Rowland Hill was to this department what the first French Revolution was to politics in Europe—it was the beginning of a perfect break with the past; a free air set in to the institution, which has blown ever since. In the following year the number of chargeable letters had sprung up from seventy-six millions to one hundred and sixty nine millions, and this rapid spring has been since well maintained. If we mark the increase every five years the advance will be sufficiently evident. Thus in 1845 the number had advanced in round sums to two hundred and seventy-one millions, in 1850 to three hundred and sixty millions, in 1855 to four hundred and fifty-six millions, in 1863 to six hundred and forty millions, and in 1865 the gross total of articles conveyed through the Post-office amounted to eight hundred and eighteen millions nine hundred and ninety thousand.

It is satisfactory to know that notwithstanding the hurry of business, the old love of valentine letter-writing has not been forgotten. Indeed, the blind god would appear to grow more active with his votaries as the years pass by. As we grow old we are apt to fancy that because we receive no valentines the practice is going out of favour, but let us bring this notion to the test of figures. In the year 1863 the number of these inflammable epistles that passed through the London post-offices was four hundred and ninety-four thousand seven hundred; the next year the number had increased to five hundred and thirty thousand three hundred; and in 1865 the total had advanced to five hundred and forty-two thousand. A certain amount of immunity from hard work, and, perhaps, a higher state of culture, appear to be necessary to the sending of valentines, inasmach as it appears that one-fourth of the whole number posted in the metropolis came from the western district. Again, it would seem that town life is more favourable than a country life to amatory correspondence, inasmuch as the number of valentines sent from London to the country was more than double the number sent from the country to London. How the Post-office authorities are able to distinguish valentines from ordinary letters is a puzzle to us, but of course prying is out of the question.

To the commercial world the establishment of the pattern-post has been the greatest possible convenience. The weight is limited to twenty-four ounces, and no matters of intrinsic value are allow to be forwarded; but the variety of articles thus forwarded is extraordinary. The great majority are samples of tea, sugar, coffee, hops, cotton, wool, &c., but in some instances live animals, most delicate watch movements, sets of teeth, samples of ore, &c., pass through safely to their destination.

The book-post and the free and chargeable letters have increased in a remarkable degree, and from their bulk and weight add very materially to the labour of the postman. Nearly a hundred thousand of these articles passed through the Post-office in the year 1865. The upper sorting-room in that establishment every Friday night presents a most extraordinary spectacle. This day in the week is by far the heaviest, inasmuch as all the weekly papers are added to the bulk of the dailies. They are passed up to the sorting-tables in a perpetual stream, by means of the mechanical lift. As these are sorted and deposited in the various bags, they are slid down a shoot, which deposits them close to the vans waiting in the yard below. If the Friday should happen to fall at the end of the month, in addition to the newspapers flooding the sorting-tables, the monthly magazines are received. On such occasions the energies of the department are taxed to the uttermost; sometimes, indeed, they cannot get through all the work that is before them in time for the night mails.

The lowering of the postage to one penny in 1840, although it caused a vast increase in the work of the department, for a time depressed its receipts. The net revenue derivable from this source has now reached in round numbers a million and a half of money, and it will go on increasing without doubt in the same ratio as it has done for these last ten years. This being the case, we may reasonably expect that in ten years' time the State will be in receipt of three millions annually, derived from the pence of the correspondents of this country. We think it is quite clear that it is unwise to derive a revenue from such a source. If the cause of education has gained by reducing the charges upon letter carriage it would be well to spend the excess of revenue in further lowering it. Why should we not have a halfpenny post irrespective of the postal cards? If the stamp were reduced to this value we have no doubt that the temporary loss to the revenue would speedily be made up again by the enormous increase that would take place in the number of letters carried. To the ordinary correspondent, probably, the difference between a penny and a halfpenny would not be felt, but to commercial men, who often send their circulars through the post by the hundred thousand, it would make a very great difference, and to the really poor the reduction of postage would be a great boon.

The experiment could easily be tried in the London District Post. The correspondence between the ten postal districts into which the metropolis is divided is greater than the whole correspondence of Scotland or Ireland. The closer people get to each other, the more intimate are their relations, in a social point of view; whilst in a commercial sense the activity of their correspondence is greatly intensified. For these reasons the halfpenny post suggested by Mr. Povey a hundred and sixty years ago would, we think, be most certainly successful. A decrease may also be judiciously made in the cost of registering letters. The plan adopted by the Post-office authorities of charging double registration fees for all letters containing articles of value, has led the public to send small sums by means of postage stamps; but this holds out a temptation to the postmen to steal them, and the public knows with what severity these delinquents are punished by the Post-office authorities for this crime, which the public may be said to tempt them to commit.

SWEETS, AND THEIR MANUFACTURE.

THE last thing a child inquires about is how the sugarplum it snaps up with such avidity is made. Yet the manufacture of these delicacies—we had almost said necessaries—of the nursery is a thing worth witnessing. A marvellous change has come across the public opinion respecting sugar and sweets of all kind. They used to be denounced by tender mothers as "trash and messes," and possibly because they were so denounced, they tasted all the sweeter to the little ones. Now there is no attempt to taboo that which delighteth the juvenile palate most. In moderation, there is nothing more wholesome than sugar; and it is, withal, nourishing and warming, in consequence of the large amount of carbon contained in it. Formerly lollypops were not a speciality; there were no large establishments for their production; they were, in fact, one of the miscellaneous items kept in bottles at the pastrycooks. All the higher-class sweets came from France and Italy, where for ages they have been famous for these delicacies. But the introduction of steam into their fabrication has given to England the lead in manufactured sugar articles, which are now made on the largest scale, and are vastly cheapened since the days when we used to spend our halfpence in toffy. The rude style of old is also gone. The eye must now be satisfied as well as the palate, even in the cheapest items. Think of a halfpennyworth of sweets done up in a ruby-coloured gelatine packet. There was colour, it is true, in some of the more showy sweets of old, but it was metallic colour, containing the most virulent poison. Dr. Hassall's analysis of this painted confectionery, published in the *Lancet* some years ago, exposed the villainous manner in which this vividly-coloured sweetmeat was made attractive to the children by poisonous paint. The brighter the hue the more deadly the sweet. The brilliant green, for instance, with which the toy-confectionery was adorned, contained arsenite of copper, as we shall presently show. One can quite understand the bad name sweets acquired when thus made up. There was vermilion in the reds, of course, and gamboge and chromate of lead in the yellows. No doubt many young children were absolutely killed by plentifully partaking of these artistically poisoned comfits. The analysis of the *Lancet* has delivered us from this cause of infantile trouble. Nothing but harmless vegetable colours are now used, which, if not so brilliant as metallic ones, are quite safe. The production of sugar-plums on a manufacturing scale has caused swifter methods of fabrication. The small items, such as rings, scissors, shoes, and hats, are cast in starch moulds, and the delicate sweets containing some essences, such as pine-apple essence and pear essence, are made in the same manner. It puzzles older heads than those of the children to know how this drop of delicious liquid gets into the centre of the sweet. Like many other puzzling matters, it is very easily explained. The flavouring essence is mixed with the liquid sugar, and when poured into the mould the latter crystallises immediately over the former. These essences, so nice to the taste, are the most remarkable examples of the power of chemistry to transform very repugnant materials into delicacies. Fusel oil is the base of the pear essence, and pine-apple essence is obtained by diluting ether with alcohol. The chemist in his laboratory with great cunning manufactures scores of these essences, which are supposed to be the veritable product of delicate fruits. Some of the pretty forms that are made to take the fancy of the little ones are simply punched out of flat films of sugar rolled; some are cast, as we have before mentioned; some are pressed into shape, when soft, between engraved rollers. The drops and sweets that are quite clear are boiled so long that all the water has evaporated out of them. Such sweets must be immediately bottled up, or preserved from the air, otherwise they absorb water and become semi-liquid. Barley-sugar is an example in point. If it is not hermetically sealed down in tins, it deliquesces, and loses all its crispness. It is as well to know that this is the purest of all sweets—being absolutely clarified sugar, and therefore the most wholesome for children. On the other hand, peppermint drops are the most open to sophistication. They should be made of crushed white sugar, mixed into a paste with gum. But the temptation to adulterate is too great for the dishonest trader to resist; consequently, in order to supply the cheap market, one half plaster of Paris is mixed with inferior sugar. One can quite understand the sickness that overtakes children sometimes after sucking these comfits; the wonder is that such a mass of plaster does not interfere more signally with their digestion. Jujubes, those flexible lozenges which stick so in the teeth, contain a large portion of gum. They are poured into tins to cool, stoved for several hours, sliced into sheets, and then cut by scissors into the well-known diamond shapes.

The veritable sugar-plum, or almond drop, is made in a very interesting manner. A number of almonds, after being coated with a little gum to catch the white sugar, are thrown into a deep pan surrounded with steam. This pan revolves sideways at an angle of forty-five degrees. As it revolves the almonds of course tumble over one another, and whilst they are doing so the workman pours over them from time to time liquid white sugar, allowing a sufficient time to elapse between each supply for the sugar to harden upon the comfit. In this way it grows by the imposition of layer upon layer, until it is the proper size. By this simple motion the sugar is deposited in the smoothest and most regular manner. Girls are largely employed in the sugar-plum trade; they are quick, and stick well to their work; but they have a sweet tooth, and help themselves to the lozenges pretty liberally. As it is impossible to stop petty pilfering, they are given liberty to eat as much as they like, and the establishment we went over annually debited itself with a sum of two hundred pounds for the sweets consumed by the children. They certainly did not look any the worse for their unlimited consumption of lollypops, and gave a sufficient answer in their ruddy faces to the old charge against the deleterious nature of sugar-plums.

The manufacture of the surprise nuts is done with the utmost speed by these little workwomen. The nut is first opened by means of a rose cutter; the kernel is then cleared out with a penknife, the hollow is filled with seed-sweets, and the hole by which they have been introduced is sealed with chocolate. It is great fun, of course, when you have cracked a nut to find your mouth full of these small sugar-seeds, whether you expected the surprise or not. In one part of the establishment we came upon the little artists colouring the small articles cast in sugar. It was all vegetable colour, of course, and quite harmless. There is no great artistic talent required in the colouring operations they have to perform, and it is too cheaply paid to be very carefully done; but however poor they may be as works of art they are not unwholesome, which, as we have before said, was far from being the case a few years ago, before Dr. Hassall turned detective officer for the good of our little ones. Here, for instance, is his report of some mixed sugar ornaments, just such as we have described the children colouring:—

"Purchased in middle Row, Holborn. The confectionery in this parcel is made up into a variety of forms and devices, as hats, jugs, baskets, and dishes of fruits and vegetables. One of the hats is coloured yellow with chromate of lead, and has a green hatband round it coloured with arsenite of copper; a second hat is white, with a blue ribbon, this pigment being Prussian blue. The baskets are coloured yellow with chromate of lead. Into the colouring of the pears and peaches the usual non-metallic pigment enters, together with chromate of lead and middle Brunswick green. This is one of the worst of all the samples of coloured sugar confectionery submitted to analysis, as it contains no less than four deadly poisons." That the fashionable West was guilty of selling sweets equally adulterated with those of the Drury Lane and Holborn shopkeepers, we give in proof one more analysis of a fish purchased in Shepherd's Market, May Fair :—"The top of the nose and the gills of the fish are coloured with the usual pink, while the back and sides are highly painted with that virulent poison, arsenite of copper." We might describe scores of specimens purchased in every quarter of the town full of the like poisonous matter, but they are now things of the past. It is a misdemeanour to use metallic colour in confectionery; it is just possible, however, that some of the old sweets may still remain unsold, so we bid parents beware of any sugar-plums with vivid greens and reds, for they are sure to be poisonous.

Steam has helped us to undersell the French; now we export to that country much of the coarser kinds of sweets. In England we make for children, in France the "bonbon" is made for children of a larger growth. Nothing can exceed the taste with which the sweets are put before the public across the Channel. The boxes they are packed in are works of art in themselves. About Christmas time some of our leading West End shops are full of the artistic confectionery from the Parisian manufactories. It looks so pretty that we scarcely like to demolish it. It must be remembered that the presentation of caskets of sweets is a custom among the fashionables in France; our neighbours have, therefore, to meet the critical and fastidious tastes of adults, and hence comfits, &c., rise in that country to works of art. We like sweets in this country, but we are too great cowards to own it; we do not doubt, however, that simpler tastes will prevail, and cause more artistic skill to be exhibited than is now thought necessary for our nurseries. If we expect a large export trade it should not be forgotten that other nations require even their sweets to be presented to them in a graceful form. In order to show the increase that has taken place in the trade, we may state that twelve years ago our entire make did not exceed eight thousand tons, whereas in 1862 it had risen to twenty-five thousand tons, and is now not very far short of thirty-five thousand tons per annum. This amount does not include the rough sweets made in the hucksters' shops, nor the toffy made at home, which is not inconsiderable. If the whole nation should go back to the tastes of our childhood, like the French, the production would at once mount up to double the score at which it figures at present. That the English have a sweet tooth, witness our rich port wine, which is in itself a confection, such as no other nation but ourselves under the sun will drink. Such being the natural tendency of our palate, we do not doubt but that we shall take to sweets as naturally as the Italians do, albeit we have no Carnival in which to use them as pleasant missiles.

THE ART OF ADVERTISING.

NOTHING seems easier than to put an advertisement in the paper, but nothing is more difficult than to put the thing advertised into the public mind. There are advertisements and advertisements—those which are read by the eye and forgotten, and those which are seized hold of by the mind. To put in practice the latter method may be considered a fine art. When we take up the advertising columns of a daily or weekly paper—we recognise the fact that there is a class of advertisers who seek to force their wares upon the public by the mere power of iteration and large capitals. This is the lowest and meanest form of the art, if it may be called art at all. Such advertisers go on the principle of the scandal-monger: "Throw enough dirt, and some of it is sure to stick." "Robinson's Gents' Pants" are hung up in print in the advertising columns one above another, just as they are bodily hung up outside the glaring shop-front in the New Cut. The idea is borrowed from the American press, and is, perhaps, suited to the vulgar minds to which it is addressed. Other advertisers will have their announcements set up in a diagonal form, and even the trick of having the letters inverted is sometimes resorted to in order to attract special attention. We question whether these tricks, however, accomplish the main purpose of the advertiser—to fix the advertisement in the public mind. By far the best adapted for this purpose are what may be called interrogative advertisements. A few years ago, for instance, there was a general impression that if a man wanted a patent safety safe, there was but one man in the world who could furnish the article. But one fine morning the walls and hoardings of the town, even the pavements, were inscribed with the question, "Who's——?" Whatever the pedestrian might be thinking about, this query challenged his attention wherever he looked. Of course, it set him thinking who —— could be. He asked his friends, but no one was wiser than himself. Presently, after the town had chewed over the query, the words, "Fire, fire! Thieves, thieves!" were added to the announcement. It was now plain that an ingenious safe-maker had thus cleverly introduced himself to public notice. The acting manager of a London theatre wrote a book about advertising a few years ago, in which he greatly enlarged our ideas with respect to the art. The question, What is the best medium for an advertisement? never troubled him, inasmuch as he considered any and every object on which he could stick one was eligible for that purpose. When a drama called the *Dead Heart* was being played at his theatre, for instance, he ordered ten hundred thousand hearts in red to be worked off, which he inscribed with the words, Dead Heart. These he directed his agents to post upon everything they came across. This was done, and the town suddenly found this touching and tender device flaming in every direction—upon the pavements, upon the trees in the park, upon the seats, even upon gentlemen's backs when going home in a convivial but oblivious mood. Possibly, this plan may draw immediate attention to such an evanescent matter as a sensational drama, but for the general purposes of advertising it is too impudent and annoying.

There are in-door readers and out-of-door readers. For the former, of course, the public newspaper is by far the best medium. It is curious to notice that in the papers of the latter end of the last century we may sometimes meet with the very same names that we now see in the public prints. For instance, in the *Times* of 1798, we find the virtues of a certain powder set forth exactly in the same words in which it is still advertised. Christie still advertised his sales in Pall Mall, and so did Garraway in the City. These are names which are familiar as household words. The effect of an advertisement, say for one article, constantly repeated, is, without doubt, the most permanently effectual in fixing it in the public mind. By these means certain names become associated with certain things so intimately that we scarcely believe in the value of the things if vended by another person.

The purely literary—or rather, we should say, flowery—advertisement has quite died out. The renowned George Robins was the last professor of this art. His advertisements of estates for sale were real works of art in their way. He did not depend upon attracting the public to his sale-room in consequence of the bargains he had to dispose of, but by means of the attractive method he had of describing them. Some of his old bills are quite studies. After describing one estate as a terrestrial paradise, with exquisite humour he admitted one drawback to it, and that was "the litter of the rose-leaves, and the noise of the nightingales." Thirty years ago the public used to study the announcements of his sales as they now study *Punch*, and no doubt many an estate was disposed of entirely through the attractions of his inimitable pen. The pages of the *Times* and other journals of large circulation are looked upon by a certain class of advertisers as a deep pool is contemplated by a crafty fisherman—as a place to display his cunning fly or bait, peculiarly adapted to the prey he seeks. There are scores of anglers who dip their lines in the form of an advertisement, and sit quietly by until a bite comes, and they have not to wait long, for nothing is too strong for the credulity of mankind. Some little time ago there appeared an advertisement in a daily journal, in which the writer affected to make an offer to the reader which he assumed no one would answer, simply on account of incredulity. His proposition was made as a test to show if there was any faith left in mankind. He did not expect any reply, but he simply made the experiment. The offer was to the effect that if any of the readers would send him seventeen stamps he would return them a present suitable to their wishes. Nine people out of ten would have said that no man or woman could be gull enough to be taken in by such a bait as this; but that there were dupes, the proof was afforded us the other day, in looking over some of the returned letters in the Post-office at St. Martin's le Grand. The scheming writer, like others of his class, doubtless thought it advisable to change his address, for fear of getting into trouble. Consequently, these letters fell into the hands of the clerks of the Returned Letter Office, and extraordinary examples they proved to be of the credulity of the writers. Affecting to disbelieve the good faith of the advertiser, nevertheless they sent the stamps, entered into particulars of the station of life in which they moved, and indicated the kind of presents that would be acceptable. One young lady stated that she was about to go to a ball, and no doubt believed that she would either get a silk dress or a pair of diamond bracelets by return of post. Considering the number of respectable persons there are always out of employ, it will not be wondered at that scores of tempting baits are held out to allure them by gentlemen who live by their wits. Some of these are so worded that they might be genuine, were it not for the awkward demand for stamps. Some time ago an advertisement appeared in *Lloyd's Weekly News*, which ran as follows:—"How to make two pounds per week by the outlay of ten shillings." The plan to secure this profit was promised on the receipt of thirty postage-stamps. The reply was such a regular "do," that, long as it is, we cannot refrain from giving it to the reader:—

> First purchase one hundredweight of large-sized potatoes, which may be obtained for the sum of four shillings; then purchase a large basket, which will cost say another four shillings; then buy two shillings' worth of flannel blanketing, and this will comprise your stock in trade, of which the total cost is ten shillings. A large-sized potato weighs about half a pound, consequently there are two hundred and twenty-four potatoes in a hundredweight. Take half the above quantity of potatoes each evening to a baker's, and have them baked. When properly cooked, put them into your basket, well wrapped up in the flannel to keep them hot, and sally forth and offer them for sale at one penny each. Numbers will be glad to purchase them at that price, and you will for certain be able to sell half a hundredweight every evening. From the calculation made below, you will see that by that means you will be able to earn two pounds per week. The best plan is to frequent the most crowded thoroughfares, and make good use of your lungs, thus letting people know what you have for sale. You could also call in at each public-house on your way and solicit the patronage of the customers, many of whom would be certain to buy of you. Should you have too much pride to transact the business yourself (though no one need to be ashamed of pursuing an honest calling), you could hire a boy for a few shillings a week who could do the work for you, and you could still make a handsome profit weekly.

If any of our readers out of employment like the look of this baked potatoe scheme, we make them a present of it without asking the fee of thirty stamps, the price at which we heard of this "good thing." To young women the matrimonial advertisement is sure to draw. The villains who write them are exposed over and over again in the police courts, but still a fresh crop of victims are ever ready and willing to come and be fleeced. We should not say that South Australia, for instance, was a good place for the fashions, or that a milliner girl would make a good colonist; but no doubt a little money without the lady would be acceptable to the young man who thus advertises his wishes in the *Times* :—

MATRIMONY.—TO MILLINERS AND DRESSMAKERS.—A young man about to emigrate to South Australia would be happy to form an alliance with a young woman in the above line possessing sixty or one hundred pounds property. Any one so disposed, by applying by letter (post paid) to T. Hall, 175, Upper Thames Street, till Saturday next, appointing an interview, may depend upon prompt attention and strict secrecy.

There was no time for hesitation left here; only a few days' grace, until "Saturday next," ere the young man, not, we would say, "up from the country," was off. We may state by the way, in order to show that we are not playing with the chances of this modest youth, that this advertisement appeared twenty-two years ago, therefore no young woman clever with her needle need apply.

The second column of the first page of the *Times* contains the frantic initials, the cunning ciphers by which many a criminal correspondence is carried on. Not a day passes without one perceiving that some sad story is being transferred from heart to heart by means of a few letters. Sometimes plots are carried on by means of an understood arrangement of letters. Fond lovers know the value of this column too well, and many a line of what appears to be the merest gibberish gladdens many an eye that reads it in secret. We have it on the best authority, however, that there are certain ingenious people who make a study of reading this column, of finding the key to the cipher in which a secret correspondence is being carried on, and of inserting now and then marplot advertisements for the mere fun of the thing, and sometimes for the purpose of stopping an intrigue that is nearly ripe for execution. The bewilderments such advertisements must cause can well be imagined. Two lovers, for instance, in the habit of using the most endearing language behind the mask of secrecy, are suddenly confounded by some rough message, coming apparently from one or the other of them. Cupid, beware of this seductive column. Conspirators, put no trust in the most elaborate cipher. There is a detective on duty that delights in unravelling your secrets—a detective more cunning than Sir James Graham, as he waylays no letter-bags and breaks no seals. It is not our purpose to give many specimens of merely curious advertisements, otherwise a mere search of the *Times* advertising sheet for these last few years would furnish an extraordinary collection. We shall be excused, however, if we afford one or two specimens that have appeared in that paper. Here, for instance, is an extraordinary and witty application for the place of confidential servant:—

DO YOU WANT A SERVANT?—Necessity prompts the question. The advertiser offers his services to any lady or gentleman, company or others, in want of a truly faithful confidential servant in any capacity not menial, where a practical knowledge of human nature in various parts of the world would be available. Could undertake any affair of small or great importance, where talent, inviolable secrecy, or good address would be necessary. Has moved in the best and worst societies, without being contaminated by either. Has never been a servant. Begs to recommend himself as one who knows his place. Is moral, temperate, and middle-aged. No objection to any part of the world. Could advise any capitalist wishing to increase his income, and have the control of his own money. Could act as secretary or valet to any lady or gentleman. Can give advice or hold his tongue. Sing, dance, play, fence, box, or preach a sermon; tell a story, be grave or gay, ridiculous or sublime, or do anything from the curling of a peruke to the storming of a citadel, but never to excel his master. Address, A. B. C., 7, Little Saint Andrew Street, Leicester Square.

This advertisement appeared in the *Times* in the year 1850. We remember, when we read it, that we asked ourselves, "Will any one answer this incomparable person?" Thinking over the matter since, we have no doubt it attracted the attention of some lady struck with its audacity, perfect ease, and esprit, and possibly the advertiser got some more intimate and permanent berth than that of a confidential servant. Here is a companion to hang beside the spirited effusion of A. B. C. Possibly, the lady writer is a little too clever to suit him:—

TO WIDOWERS AND SINGLE GENTLEMEN.—Wanted by a lady a situation to superintend the household, and preside at table. She is agreeable, becoming, careful, desirable, English, facetious, generous, honest, industrious, judicious, keen, lively, merry, natty, obedient, philosophic, quiet, regular, sociable, tasteful, useful, vivacious, womanish, Xantippish, youthful, zealous, &c. Address, X. Y. Z., Simmonds' Library, Edgware Road.

The two extremities of the alphabet are too well matched, we fear, ever to run as pairs.

Advertisements in the public papers commenced in the time of the Commonwealth. In turning over the musty files of these journals, and in tracing the advertisement up to the present day, we were struck with the change of manners and habits of the people during the past two centuries. There was no need to look at the date of the journal; the phraseology of the time indicated it clearly enough. The exuberant loyalty of the early days of the Restoration, the announcement of His Sacred Majesty's intention to touch on certain days for the King's Evil, the advertisements of news-letter writers, and the announcements of the introduction of the curious new drink "tay," or "tee," all point to the seventeenth century. In the next hundred years we find the public cautioned with respect to certain highwaymen frequenting the high roads; trials of skill with the broadsword, and public fights between women for the championship. Here is the form of challenge and the answer, copied from the *Daily Post* of 1722:—

CHALLENGE. I, ELIZABETH WILKINSON, of Clarkenwell, having had some words with Hannah Hyfield, and requiring satisfaction, do invite her to meet me upon the stage, and box me for three guineas, each woman holding half-a-crown in each hand, and the first woman that drops the money to lose the battle.

ANSWER. I, HANNAH HYFIELD, of Newgate Market, hearing of the resoluteness of Elizabeth Wilkinson, will not fail, God willing, to give her more blows than words, desiring home blows, and from her no favour. She may expect a good thumping.

It is quite clear from this that we have lost one employment for women indulged in by our ancestors. Public fighting in an arena, even when men are the principals, is considered disgraceful; but a hundred and fifty years ago, in the gross Hanoverian days, women could step into the prize ring with applause.

The manners of the times speak through these old advertisements in the most unerring manner. The value of the advertisement to the trading community was evident enough to some clever fellow, even as far back as the end of the seventeenth century, for we find that the *City Mercury* was published gratis for the promotion of trade as early as the year 1692. It must be admitted, however, that "publicity" at that time existed only in name, inasmuch as the proprietor only promises a distribution of a thousand copies a week among the coffee-houses, taverns, and book-shops. Still the idea of a paper for advertisements only is at least a hundred and seventy years old. The wonder is that such a publication should have lasted as it did for a couple of years, which was longer than the same experiment lasted when it was tried a few years since. The reason why these failures took place is pretty clear. Advertisers do not care about such papers. They wish for the patronage of the general public, and the public can only be coaxed to look at advertisements when they are placed side by side with more entertaining reading. The more cunning advertisers know this very well, and they seek to give their trade announcements a longer life by craftily inserting them among the pages of an almanack, or other work of general reference. The insurance societies first adopted this clever method of placing themselves before the public month by month, and others have followed suit. There is not a farmer, for instance, in the three kingdoms who has not been supplied with an almanack for the present year gratis, and also with a full description of the value of some article supposed to be suited to his wants. We happened to be present in the sorting-room of the General Post-office when a large instalment of this weighty library of a hundred thousand volumes was received, and its bulk considerably inconvenienced the vast machinery of that establishment. These advertisement-carrying almanacks are a vast improvement on the mere trade-books, which the agents of advertising tailors use to shower into every passing cab and omnibus. It is clear, however, that tradesmen are bidding higher year after year for the eye of the public, and it is equally clear that he who bids the highest will secure the attention of the public most effectually. Let us therefore recommend some pushing tradesman to work the idea thoroughly, by issuing gratis to every man registered in the general directory, in addition to an almanack, a diary that may be made really useful. "Persons about to marry" would forgive being informed where to go for furniture at the top of every page.

But the newspaper and the book have long ceased to be the sole means of advertising. The dead wall has now become a valuable property, if it be situated in a much frequented thoroughfare. Spaces are measured off and charged for at so much per foot, just as advertisements are charged by the column and half columns in the journals. The interiors of the omnibuses are let out in the same way, and even on the Metropolitan Railway the wall spaces on the sides of the carriages are let to a great contractor, and sub-let by him. It really seems as though the stage manager we have referred to was a true prophet, and every available inch of space in this mundane sphere will in the future be devoted to the purposes of the advertiser. Not many months ago some blacking-maker stencilled his advertisement upon the pavements of all the great thoroughfares; and later still, a certain sauce meets the eye on every paling. Even the copper coinage some time since was made subservient to the purpose of advertising, an energetic newspaper proprietor having stamped upon the regal cheek the name of a weekly journal.

Walking advertisements—we do not mean board-men, but peripatetic individuals wearing the articles to be advertised—are now common. We met an individual of this class wearing a coal-scuttle on his head by the way of casque; and some ingenious individual in Regent Street engages a squad of men to carry each a letter high over his head spelling the name of his establishment. There is a drawback to these letter men, however, inasmuch as they get out of their place, and hence they do not spell. Gigantic hats on wheels sometimes parade the City, but this style of advertising is not so much practised as it used to be. Going along New Oxford Street the other day we came upon an establishment for the sale of fire-escapes, and in order to show the public how well they worked, a boy was employed to descend from the top-floor window inside the canvas bag, the mere friction of his knees and elbows sufficiently checking his descent. It appeared that he was employed to circulate in this manner all day, to the edification and instruction of a gaping crowd. Posters on the walls have made a great advance; their text is illustrated in colours, and sometimes very well. The children of the present day may see picture books on the walls far better executed than were the best nursery tales in the boyhood of the last generation.

We have not alluded to the pictorial advertisement in the newspaper. Thirty years ago Cruikshank's capital wood-cut of the cat seeing herself reflected, and spitting at the boot, stood almost alone; but now the country papers teem with wood-cuts in the advertising department, not forgetting the famous "Ah, ah! cured in a moment" toothache advertisement, which represents the gentleman before taking the remedy bent up with agony, and after its application jumping about with joy. The metropolitan illustrated journals court these better-class wood-cut advertisements, and perhaps one of these days we may see them coloured—indeed, we see such stitched into books and magazines, and very often affording the gayest feature in them. But the subject of advertising presents endless features—indeed, it is ever varying and extending itself as the struggle in the trading world becomes fiercer. We have contented ourselves with showing the reader a few of its phases and more ingenious devices. It would require a volume to describe the art and science of advertising in extenso.

IRON-WORKS, ANCIENT AND MODERN.

The popular notion of iron-smelting connects it with a barren country canopied with perpetual smoke, and a dismal land covered with slag, and poisonous, by reason of its sulphurous fumes, to all vegetation. This is true enough of English iron-works of the present day; but it is utterly untrue of the iron-smelting works of the past at home, or, indeed, of those which exist abroad—say in Styria—at the present moment. Of old—indeed, not more than a century ago—we did our smelting with charcoal, and capital iron was made by this process, far better than that we extract by means of coal. The necessity of obtaining this ligneous fuel settled the smelting places in the midst of woodlands; hence iron-works of old were particularly picturesque objects, situated for the most part in Sussex, Surrey, and Kent, where to this day the ruins of the old works are still to be seen. These bloomaries, as they were called, existed from a very early date, long before coal was used or the steam-engine was invented, and the motive power employed in making bars and sheets was the water-mill. Any pedestrian taking a tour in the bye-ways of either of the counties we have mentioned, will still see the great mill-ponds, sometimes converted into fowl-preserves, sometimes utilised to store water for paper and flour-mills. No more iron will ever come from these old neighbourhoods, neither has it done for a hundred years. The City man, as he passes Saint Paul's Churchyard, sees the very last specimen of English charcoal-made iron in the railings surrounding the Cathedral. These were made at Lamberhurst, near Tunbridge Wells. From an early date these iron bloomaries were denounced for the manner in which they were consuming all our woodlands. It took four loads of timber, we are told, to make the charcoal required for every ton of pig-iron, and to convert this into bar-iron required three loads more. When our ancestors beheld their oaks and beeches disappearing in the maw of this inexorable monster, when woodland after woodland vanished off the face of the land, no wonder that great discontent was occasioned; indeed, such was the fear of the people that all their fuel for keeping warmth in them in the winter would be consumed, that the early governments of the Tudors and Stuarts were obliged to restrict the number of bloomaries in the home counties, and the iron-masters were forced to go further afield for their supplies of wood; and their first retreat was into South Wales, where both iron and wood existed side by side.

In the middle of the last century there were only fifty-nine furnaces in England, and in Sussex itself the Ashburnham forge was the last that was blown out, and the hammer-pond may be now viewed as a most picturesque antiquity, but alive with fish and wild fowl—a perfect sylvan scene. It would be difficult to imagine a scene such as these bloomaries afforded in their palmy days, when the merry mill-wheel plied the big hammers, amid the songs of birds, and the perfumes of flowers, the waving of trees, and all the sights and sounds of a country life, turned (by the mere accident of coal-fuel appearing in the place of wood) into the dismal waste such as we now see it in the neighbourhood of Wolverhampton. Here the bad fairies would seem to have changed every feature that was natural and charming into the most repulsive-looking aspect the country could by any possibility put on. Instead of verdure, we find that not a blade of grass will live in the whole of this smoke-befouled district; and as for birds or trees, they shrink in terror from the neighbourhood. The very people, moreover, are of a different stamp. Of old, the great families—the Howards, the Nevilles, the Percies, and the Pelhams—were great iron-masters, a more gentle set of craftsmen, though possibly not so 'cute. It would make a good dissolving view, the sylvan bloomaries of Kent giving way at the touch of King Coal to the blasted heath, alive with the infernal-looking fires, in the so-called Black Country.

The smelting of iron with pit-coal was, indeed, attempted as early as the year 1620, and Dudley, the man who was far-seeing enough to know that this material was to be the smelting fuel of the future, unfortunately was ahead of his age, and, like all such, was a martyr. If he had gone on, England would have had a grand start of other nations, but the civil wars put an end to his experiment, and it was not until the time of Richard Reynolds, of Bristol, that the perfect practicability of the scheme of smelting with the new mineral was admitted. About this time the improved process of making cast-steel was discovered by Benjamin Huntsman. This process was afterwards improved by Heath and Mushet, and in our own day it has been brought to perfection by Bessemer, who makes any quality of steel by arresting the process at particular stages.

The labours of Huntsman were at the outset very nearly counteracted by the short-sightedness of the Sheffielders, who, instead of welcoming the new process of so much importance to their trade, actually declined to use it, and Huntsman was very nearly removing his forges to Birmingham, where he had been invited. The French, seeing the value of the improved steel for all cutting edges, largely used it, and they began to be famed as edge-tool makers. This exasperated the Sheffielders so that they attempted to prevent the export of the article—a pure example of the dog-in-the-manger spirit. On another occasion, in 1750, when the use of coal in smelting was encouraged by Parliament, the tanners of the City petitioned against its introduction on the following roundabout plea:—The English iron—charcoal iron—they said, would be undersold, forges would be discontinued, and no timber being necessary for fuel, it would remain uncut, and the tanners would be without bark for the purposes of their trade. The Sheffielders of the present day, without doubt, are as perverse as their forefathers.

Henry Cort, again, was a man who advanced ironworking many stages. By his system of "piling" and "fagoting"—in other words, of laying bars of iron one upon the other, and welding them at a great heat by a powerful forge hammer into one piece—masses of iron such as never were before seen came into use. His method of making bar iron from cast iron by passing it through grooved rollers, laid the foundation of the fortunes of many large iron-masters, although it brought but little grist to his own mill.

The iron trade in South Wales, where it first settled after its banishment from the southern counties, has developed in a wonderful manner since the discovery of the blast furnaces, and only lately we have seen a great iron-master leaving his son seven millions of money. But it is in Scotland that the manufacture has sprung up in the most wonderful manner within the present century, and principally through the energy and genius of two men, David Mushet and James Beaumont Neilson. The discovery of the famous black-band iron-stone by the former may be looked upon as an accident, but one that only an energetic man like Mushet could or would have taken advantage of. Whilst crossing the river Calder in the year 1801, a specimen of ore attracted his attention; he picked it out, took it home, and found that it contained fifty per cent. of the protoxide of iron. He did not leave this discovery here, but, following it out, he found that it was only a specimen of a great bed running through the western counties of Scotland. The iron-masters of the day laughed at the idea of these "wild coals," as they termed them, turning out good iron; but they were soon obliged to admit that the proportion of coal in the band was sufficient to make it smelt itself. But this process could only be carried on by a new discovery, and the discoverer was close at hand. Neilson, contrary to the opinions of the old iron-masters, thought that if he could warm the blast thrown into the furnace he should be able to make a more powerful draught. This idea was directly contrary to the notion then in vogue, which was that the best iron was made in winter, in consequence of the greater amount of oxygen in the air. Consequently, they endeavoured to imitate this state of things by cooling down the blast as much as possible. Neilson, on the contrary, by heating the air—and by so doing greatly expanding it—produced a much greater draught—sufficient, in fact, to smelt the black band without the addition of any coal at all. In our own day, besides Bessemer, who has done so much for the iron trade, we may mention the famous steam-hammer of Nasmyth, without which the great iron-work of the present time could not be accomplished.

BAD BOOTS.

THE reader must not suppose from our title that our pen has been purchased by the owner of a patent for some improved method of boot-making; we do not care, in fact, how they are made: our business is entirely confined to the moral and physical influence of a pair of shocking bad boots. There are some people who never know what it is to feel a weakness in what we may term their bodily understanding. They keep rows of boots of all sizes and shapes, duly polished, in their dressing-rooms—some for wet, some for dry, some for hot, and some for cold weather. Such people will feel no sympathy with anything we may have to say respecting the influence upon a man's conduct of a pair of indifferent boots. But there are many, possibly the reader among them, who are careless about such matters—wear an old pair of shoes to the ground, as it were; stick to an old pair of boots until the heels incline on one side at an angle of forty-five degrees. Such people will understand us when we say that possibly the moral effect of a bad pair of boots may have influenced their conduct in some transaction that may have proved the turning-point of their lives. The influence of boots upon the mind is very different from that of any other garment. A man may have a shocking bad hat, but he forgets it; his coat may be threadbare, but his mind is not directed towards it; but we defy a man to stand upright in a pair of bluchers with worn-down heels, and we believe that it is just as difficult to feel morally upright in them. A sense of meanness possesses him; he feels that everybody is noticing them. He cannot look people straight in the face and feel upon the square with them. He feels the weakness of his foundation, and he mistrusts the character of the superstructure that they support, however imposing in other respects. A man shabby in the boots sometimes flatters himself that he carries off attention from them by the use of a splendid neck-tie; but this is a delusion and a snare. The boots are the key of the position, and we feel sure that no man ought to undertake any serious matter unless he stands up in a good sound pair of boots.

A celebrated physiologist has said that if human actions could be searched into, it would be found that the intestines of one man often influence the destinies of another. Doubtless this is a profound remark, but it applies to upper and nether soles as well as to digestion. By way of argument, imagine the final charge of the Guards at Waterloo made in bad boots. It would have been all very well for the Great Duke to have said, "Up, Guards, and at 'em;" but could they have got at them? And if they had failed, and we had lost Waterloo, what next and next? But, badinage apart, no one will feel inclined, we suppose, to deny the influence of the mind upon the body, and *vice versâ*. When boots are hopelessly gone, shame seems to have departed also. What terribly bad boots we see crossing-sweepers following their profession in. But these are put on sometimes to excite pity. We feel this, and the effect is lost upon us. But is there a more piteous sight than a poor beggar with a boot on one foot and a shoe on the other? A man brought to this point of degradation must be demoralised beyond the hope of recovery. With women the moral influence of bad boots is not so great as with men, for the reason that they contrive not to show them; but the physical influence is far more serious. The writer, speaking from a long experience in the practice of a dispensary, where the poor mainly apply, can safely say that not a tithe of this class possess sound boots. Hidden under the petticoats, they are allowed to wear sometimes until the feet are just upon the ground, and the wearer's stockings are from morning to night, in wet weather, in a state of sop.

This may seem a minor evil, but it is just the one that causes half the disease among poor women, whose constitutions render them far less able to bear exposure of this kind than the other sex. There are clubs and benefit societies of all kinds, but we cannot fancy an institution that would do more immediate and lasting good than a "Good Boots Club" for the benefit of women. We may ascend higher in the social scale, and find the same evil prevailing. Many poor governesses and servants are shockingly shod. It is just the weak point in their dress which they can hide, and they invariably do it, whereas it lies at the foundation of health and that of their children, and it should claim their first attention. We laugh at the clattering wooden sabots of the French and German working classes, but in comparison with the flimsy, ill-made foot coverings our own poor indulge in, they are more healthy and lasting; but fashion, even with the very poor, is far more powerful, we fear, than considerations of health or service.

We have said enough to show that "bad boots" may be considered one of those social evils of the day worthy of recognition. It was the wish of one of the best French kings that every poor man should have a fowl in his pot. If wishes had the power of fulfilling themselves, it would be a good wish that every poor woman had a sound pair of boots to her feet. If that were the case, there would be far less disease, and half the dispensary doors in the town would be closed.

RAILWAY SEASON-TICKETS.

Within these last twenty years the railroads radiating from the metropolis have had a remarkable effect upon the social arrangements of professional men, merchants, and others, who daily dip into the great herring-pond, London, by way of seeking their daily bread. The rings of Saturn were thrown off by a sudden cooling of the central body and an expansion of its circumference. The facility of travelling has created a suburban ring—if we may so call it—of country residences, miles and miles away beyond the green pastures the Cockney used to look upon as the paradise of retired merchants, the limits of which could be reached by an omnibus. This singular transfer of citizens, born with the tastes of townsmen, to country neighbourhoods must have dislocated their old habits in a very remarkable manner. And we are anxious to know what effect it has had upon them. Can it be possible that people who were wont to live upon the excitement afforded by the theatres or the opera—can the young ladies, the breath of whose life is the ball, or the soirée, or concert—be content to receive as a substitute the tranquil delights of witnessing the growth of spring salads, or the mild excitement of croquet among themselves?

Surely this sudden banishment of thousands of metropolitan households from the scenes of their old social battle-fields to distances beyond the limits of a hansom or a brougham, must have given rise to revolts and rebellions that would have made themselves heard, had the poor victims the opportunity of meeting and discussing their grievances among themselves.

As far as we can see, the isolation thus induced by the dispersive power of the rails running from the capital, leads to a condition of society the very opposite of that which formerly existed among them when they crowded together in the great West End squares. Socially, we certainly pity the poor women; with the men it is different. Like the rooks from a rookery, in the early morning they wing their flight by rail to the distant feeding-grounds of the City, they are excited all day by business, and they return to the rookery at night tired and weary. The calm and quiet of the country is heaven to them; they do not pity the isolation of the women, and possibly they wonder how it is they are not as satisfied as themselves.

But nevertheless, Paterfamilias in time finds that there are drawbacks to these long journeys to and fro. It is all very well to be at home amid his flowers and fruit-trees in the summer evening; it affords him delicious repose after the rush of Fleet Street, or the Babel of voices on the Stock Exchange; but the daily journey is not without its disadvantages. In the first place, is there any minor misery in life more annoying than having to be perpetually on the worry towards the afternoon lest your business should detain you beyond the time of the departure of the express train? There are some people that delight in fitting in their spare minutes so as to suit the inexorable machine that is to carry them home. We believe this class of men feel a certain grim satisfaction in knowing that a stern punctuality, which gives them such pleasure, is sure to irritate and flurry their plethoric friends and acquaintances, who have to run to catch up the time they have lost in chatting with an old acquaintance, and who consequently enter the carriage in a state verging on apoplexy. The horror of the middle passage, as we may term the rush to the railway station, is, however, only the beginning of the trouble to a middle-aged man, who has not subjected himself to a course of Bantingism. We hear individuals now and then talking of the ease with which the season-ticket holder journeys backwards and forwards daily from Brighton. By the young healthy man, no doubt, the journey is done without fatigue; but after a certain time of life, the process of being conveyed by express fifty miles night and morning is anything but refreshing. The shaking and jolting of the best-constructed carriages is not such as we experience in a coach on an ordinary road; but is made up of an infinite series of slight concussions, which jar the spinal column, and keep the muscles of the back and sides in continual action. The want of proper springs on the carriages throws the whole duty upon these muscles; they have ever to be on the watch to adjust themselves on the moment to some sudden call. This incessant action gives rise to the feeling of soreness persons experience after having made a long railway journey.

But the effect of concussion upon the nervous system, and especially upon the spinal column, is of a more permanently disastrous character than would be generally supposed. Doctor Radcliff, who has witnessed many cases of serious injury to the nervous system through this cause, contributed the following conclusive case some years since to the pages of the *Lancet:*—"A hale and stout gentleman, aged sixty-three, came to me complaining of inability to sleep, numbness in limbs, great depression, and all the symptoms of approaching paralytic seizure. He was very actively engaged in large monetary transactions, which were naturally a source of anxiety. He had a house in town; but having been advised by the late Doctor Todd to live at Brighton, he had taken a house there, and travelled to and fro daily by the express train. The symptoms of which he complained began to appear about four months after taking up his residence at Brighton, and he had undergone a variety of treatment without benefit, and was just hesitating about trying homœopathy when I saw him. I advised him to give up the journey for a month, and make the experiment of living quietly in town. In a fortnight his rest was perfectly restored, and the other symptoms rapidly disappeared, so that at the end of the month he was as well as ever again. After three months he was persuaded to join his family at Brighton, and resumed his daily journeys. In a few days his rest became broken, and in two months all the old symptoms returned. By giving up the journeys and again residing in town, he was once more perfectly restored; but it being the end of the season, when the house at Brighton could not readily be disposed of, and yielding to the wishes of his family, he again resumed his journeys. In a month's time he was rendered so seriously unwell that he hesitated no longer in taking up his permanent abode in town; and since that time (now more than two years ago) he has enjoyed perfect health."

Cause and effect were so clearly traceable here, that there can be no possible doubt respecting the injurious influence of the daily jolting by rail. And this is no isolated case. Doctor Brown-Sequard, Sir Ronald Martin, Doctor Winslow, and other physicians, have borne similar testimony to this hurtful practice, when continued by men above a certain age. So fully is it established that persons above a certain time of life are not suitable for post-office railway guards, that Doctor Waller Lewis, the physician to this establishment, will not pass them for such appointments. Neither should any person having heart disease subject himself to the nervous shocks induced by railway journeying. In the railway sorting van, which travels at night, the sorters have to stand. In this position they are subject to a far greater amount of concussion than those sitting in well-padded carriages. We have noticed and can endorse the statement of Doctor Lewis, that whilst at his duties the sorter's body sways with a sort of diagonal movement; this probably gives a certain amount of ease to the muscles, and Doctor Lewis has found that concussions are greatly broken by the use of an elastic caoutchouc mat, which intercepts nearly the whole of the vibration. This is a hint which would be useful to those who travel in hard third-class carriages. The extreme cold felt in railway carriages is another discomfort, which, if daily experienced, greatly adds to the disadvantage of having to travel long distances to and from home. The great speed of the express train which generally takes Paterfamilias home adds to the keenness of the draughts which will find their way inside, "shramming" the traveller's skin, and congesting all the great internal organs of his body.

Under these circumstances, we cannot wonder that a leading physician has come to a conclusion which will perhaps startle some of the constant riders. "Travelling a few years since," he says, "on the Brighton line very frequently, I became familiar with the faces of a number of the regular passengers on that line. Recently I had again occasion to travel several times on the same line. I have had large experience in the changes which the ordinary course of time makes on men busy in the world, and I know well how to allow for their gradual deterioration by age and care; but I have never seen any set of men so rapidly aged as these seem to have done in those few years."

The advantages of flying from the bad air of town, and revelling in the bracing air of breezy hill-sides, is, we fear, but dearly purchased if the means we take to get there are so disastrous. We suppose the social banishment has nothing to do with this ageing of season-ticket holders, but there is another evil which has grown out of this nightly railway migration into distant parts, which has not, as far as we know, been dwelt upon. It is the hand-bag nuisance. A friend of ours, who lives down the Great Western line, told us the following amusing little domestic episode, which grew out of the banishment of his wife and belongings to pastoral scenes. His wife came up to him one evening, and said, with the air of a person about to confer a great favour upon him:—

"Charlie, dear, I've got you such a nice hand-bag."

"Hand-bag? what, my darling, do I want with a hand-bag?"

"Oh, my dear, you don't know how very convenient it will be."

I said nothing, but I felt an inward warning that henceforth I must consider myself nothing better than a human retriever. The next day the mystery of the hand-bag was clearly unfolded. The usual kiss had been given preliminary to my rush to the train. I was just on the point of slamming the door, when my wife said beseechingly—

"You'll do me a favour, Charlie, won't you?"

I said Yes, of course, but I did not see that she held the black bag behind her all the time. That bag was the beginning of a series of fetching and carrying, the end of which I feared I should not see until my dying day.

"This is the bag," she said, as though I did not see it plainly enough.

"Well, what then?"

"Oh, only, my dear, that old Jodkins is such a shocking old cobbler, and you know I can't appear with you on Sunday with boots in this condition."

With that she opened the bag, and showed a little pair that certainly wanted attending to.

"Well, and what can I do with them?"

"That," she replied, "is just the value of the bag."

I pretended to open my eyes as though I didn't quite catch her meaning,

"Now don't look like that, you old stupid thing. All you have to do is to leave them for me at the maker's on your way to the office, and say you will call for them in three days' time."

This was a tremendous order—to carry a pair of old boots to the bootmaker's; "but the leather bag," I said to myself, "will allow me to do so genteelly;" and with a tolerably good grace I consented. After that day the genteel black bag was never out of my hand.

"There really is no getting anything in this outlandish place," she said one day. "You must bring home the dinner to-day if you want any, as our butcher does not kill this week."

This was the beginning of a series of visits to the town butcher, upon whom I was forced mainly to depend; and on one occasion, I remember, that bag gave rise to a terrible scene in the railway carriage. I have a particular predilection to a pig's fry, and had duly provided myself from town with the necessary materials for the production of that delicate dish. As fate would have it, my journey home that night was doomed to be marked by an untoward event. We had just got to the Jarbones Junction, and I was settling off into a little doze, when I suddenly felt my head propelled into the stomach of a very stout gentleman who sat opposite me. There was a sudden crushing up of carriages, a wild shriek, and then we came to a standstill. It was pitch dark, for the collision had knocked the lamps out, and we waited with fear and trembling whilst the guard went from carriage to carriage to see what injuries had been inflicted upon the passengers. Slowly the lamp of that worthy stole along from one dark compartment to another, and it appeared, after all, the passengers were more shaken than hurt. At last the bull's eye was turned slowly on into our own carriage, to reveal a truly dreadful sight. The guard shuddered. My poor "vis-à-vis" lay prostrate. The other passengers made exclamations of horror, and I certainly thought that I had committed an involuntary homicide, judging from the ensanguined condition of the floor of the carriage. I was too bewildered to notice anything more, and I think I should have gone off into a dead faint had not the guard tapped me on the knee, and asked me if that was my bag that had been burst open in the collision. I looked for a moment dazed, and then gave a joyful cry. After all, it was nothing more than my dinner that lay scattered upon the floor, and there was no damage done further than the breaking of the lock of the black bag. This was a warning to me, however. I determined to fetch and carry no more, and I stood to my resolve. There are scores of human retrievers still to be met with in the train as I journey backwards and forwards, and I often wonder what their black bags contain. Is it a pair of old boots going to be mended? or chops going home to be broiled? Are they going to the co-operative store to be filled with the week's groceries? or do they contain a choice bottle of prime brown sherry at one-and-six? or is the poor clerk who carries it only taking home more work for the night? Possibly, I say to myself, these bags contain some awful mystery. Was there not a terrible tale told of one that was lowered upon the third abutment of Waterloo Bridge?

When once you get odd ideas into your head about the stream of black bags that are ever coming and going from and to railway stations, it is difficult to get them out again. Let the reader, however, take warning by us, and never be tempted to adopt this institution; if he does, it will master him, and he will ever afterwards be the slave of the black bag, not one of the least inconveniences and evils that attach themselves to men who buy season-tickets, and go away every night in the dark beyond the pale of civilisation, the limits of the Parcels Delivery Company, and the reach of the baker's and the butcher's carts.

THE STORY OF THE STEAM-ENGINE.

THE history of the discovery of a great invention, one which makes its mark upon all succeeding generations, cannot fail to be full of human interest at all times; but the successive steps by which the steam-engine was built up is almost as interesting as a romance. The public in general have a belief that it sprung from the brain of one man—like Minerva from the brain of Jove; but in reality nothing could be further from the truth than this. From the time that the first observing individual witnessed the power steam had to lift the cover of any vessel in which water may have been boiling—the latent power of the vapour of water impressed itself upon men's minds; and no doubt very much "unconscious cerebration," to use a very expressive term, took place touching the possibility of utilising the new force long before the Marquis of Worcester thought of the matter. That nobleman, however, was unquestionably the first who ever made any experiments, or at least who went so far as to construct an engine that actually worked by means of its expansive power—always excepting the toy invented by Hero of Syracuse. We know that the marquis forced water to great heights by the power of steam, but this may have been done in many ways, without his having made any mechanical appliance to which the word steam-engine could have been applied; but we have his word, in his "Century of Inventions," that he had constructed a machine of this kind, a model of which he designed should be buried with him. The chief of the Patent Office Museum at South Kensington, Mr. Woodcroft, noted this intimation of the wishes of the mechanical marquis, and, in the hope that it might have been carried out, with the permission of the Beaufort family, searched the vault where he was buried at Raglan; but his "semi-omnipotent engine" was not to be found, neither is there any clue remaining to lead to the belief that there are any remnants of it in existence, if indeed it was ever preserved. The idea of such an engine was abroad, and the ingenious marquis was not the only philosopher whose mind was running upon steam as a motive power. We have seen of late years that many great discoveries and inventions have simultaneously occupied the minds of ingenious men, and have produced fruit unknowingly to each. It was the case with the discovery of the new star, the honour of the announcement of which is equally shared between an English and a French mathematician; it was so with photography, the discoverers of which had been working at the same idea without each other's cognisance; and we suppose it may be accepted as a law of the human mind, that the wants of the age call forth a supply at the right time from many minds having no connection with each other. Be that as it may, both Dionysius Papin and Sir Samuel Moreland were working at the construction of a machine to be worked by steam at the same time as the inventor of the "semi-omnipotent engine;" but, like him, they were a little before their time. To make any successful discovery, two things must be in accord—the discoverer, and the age that is to make use of the discovery. The spark may be struck, but the tinder may be damp—hence there will be no light. The seventeenth century, it is clear, was not sufficiently scientific to kindle into a blaze the ideas of mechanical thinkers.

It often happens that what philosophers fail in producing, practical men, having the want before their eyes, manage more successfully; and it was so now. The practical man this time was not, it is true, a working man, as he was a military engineer. This man, however, set himself the task of performing a certain service. The mines of Cornwall were being "drowned out" by the inability of the contrivances of the age to pump them dry; and Thomas Savory, prompted, no doubt, by the urgency of the want and the prospect of direct gain, set to work to make a steam-pump, or at least a pump that used steam, which, upon being suddenly condensed by cold water, produced a vacuum, and by that means created a powerful suction, capable of drawing the water from the depths of the mines. Now, although this engine was not exactly a steam-engine, yet steam was the agent used to put in force a natural power, and accordingly its use for the first time drew the attention to it of all practical men. The steam-engine was now waiting at the door, and this time it was really a working man who put into practice the floating ideas of the age. But possibly Robert Newcomen, the Dartmouth blacksmith, would have failed had not a philosopher come to his aid with the pregnant suggestion that to make a working steam-engine, the means of producing a speedy vacuum was essential, not to suck water, as in Savory's invention, but to produce motion. Another working man, named Calley, was associated with Newcomen in accomplishing this object; thus the trio who made the first working steam-engine—or fire-engine as it was called, or, as we should call it, half atmospheric, half steam-engine—was composed of a philosopher, who formed the idea, and two mechanics, who practically worked it out. Mr. Smiles, in his Life of Bolton and Watt, thus describes this engine:—"The steam was generated in a separate boiler, as in Savory's engine, from which it was conveyed into a vertical cylinder underneath a piston fitting it closely, but movable upwards and downwards through its whole length. The piston was fixed to a rod, which was attached by a point or chain to the end of a lever vibrating upon an axis, the other end being attached to a rod working a pump. When the piston in the cylinder was raised, steam was let into the vacated space through a tube fitted into the top of the boiler, and mounted with a stop-cock. The pump-rod at the end of the lever being thus depressed, cold water was applied to the sides of the cylinder by which the steam within was condensed; a vacuum was produced, and the external air pressing upon the top of the piston forced it down into the empty cylinder." It must be remembered that instead of the packing with which the edges of the piston-rod is now made steam-tight in this engine, the vacuum in the under part of the cylinder was attempted to be secured by placing water upon its upper side. This led to one of those lucky discoveries which but rarely occur in mechanical arrangements—at least in the present day: a small hole in the piston allowed a jet of water to be pressed into the under side, which of course caused the steam to be suddenly condensed, and a vacuum was therefore produced more rapidly than in the ordinary working of the engine. This defect was afterwards imitated by art, and thereby a great saving of coal was effected. A still more fortunate observation was made by a boy employed to turn two cocks alternately, one admitting the steam into the cylinder, the other allowing the condensing water to enter. The boy, noticing that his work could be done by the alternate ascent and descent of the beam overhead, contrived, with a piece of string, to get his work done automatically, whilst he engaged his leisure in play.

The reader must not imagine that the old Newcomen engine, which for seventy years and upwards did the work of keeping the Cornish mines free of water, bore any similarity, as regards appearance or smoothness of working, to a modern engine. It certainly was a most unwieldy looking machine, so ill-fitted that it groaned as it worked, like a thing in pain. Instead of the piston-rod being adjusted with the beautiful parallel motion Watt afterwards invented, it was attached to the end of the beam by a chain, which worked over its semicircular end. But description is utterly powerless to describe what a rude machine this old engine was. At first, the Newcomen engines were thought wonderful contrivances; but as the mines grew deeper, their consumption of coal became tremendous, and it was clear that unless some great improvement was made upon them the mines could not be worked profitably. Just at this moment a lucky accident occurred, if we may use the term, which had, perhaps, a greater influence in giving England the lead in the world as a manufacturing country than any other circumstance. The great Watt was at that time living close to the College of Glasgow, and was known to many of the professors as a clever mathematical instrument-maker. The professor of natural philosophy, happening to have a model of a Newcomen engine, with which he was in the habit of illustrating his lectures, out of order, by accident, as we have said, sent it to the shop of Watt to be repaired. This circumstance, had it occurred to ninety-nine out of every hundred working mechanicians, would have resulted in the repairs necessary being done, and there would have been an end of the transaction; but in this, the hundredth instance, it was far otherwise: the seed that was sown in the mind of Watt was to fructify. The more he examined the machine the more he seemed to be impressed with the idea that in it he beheld the germ of a mighty power. "To this remarkable man," says Professor Robinson, "everything was the beginning of a new and serious study, and I knew that he would not quit it until he had either discovered its insignificance or had made something of it." Watt soon discovered that the weak point of the engine was the cooling down of the cylinder on the outside after every stroke, and he came to the conclusion "that to make a perfect steam-engine, it was necessary that the cylinder should always be as hot as the steam that entered it; but it was equally necessary that the steam should be condensed when the piston descended—nay, that it should be cooled down below one hundred degrees, or a considerable amount of vapour would be given off which would resist the descent of the piston and diminish the power of the engine." In these words we have the whole theory of the steam-engine; but poor Watt had to suffer many a bitter disappointment before he had successfully embodied his idea in working iron. The idea of attaching an exhausted receiver to the piston, into which the steam would rush, came into his mind, he tells us, as he was strolling over the Glasgow Green. With the invention of the separate condenser, the great difficulty he had to contend with, as regards the principle of the engine, was vanquished. But as yet none of the great machine tool-makers of whom we were recently speaking had arisen to give life to his idea. Consequently, the cylinder of Watt's first engine had to be hammered into shape, and there left—a rough and inefficient apology for the thing required. The steam, of course, escaped in every direction, while poor Watt looked helplessly on, baffled and disheartened. But if he despaired himself, he inspired others with hope. Among the friends he gained was Dr. Roebuck, the founder of the Carron Iron Company, who came to his aid with all the resources of that great establishment. He believed that Watt was about to create a mighty agent in the world, and he assisted him with all the aid in his power. Watt, in return, gave him a third share in the engine, which in the year 1768, just a hundred years ago, was got to work. But its working was anything but satisfactory; and just at this time his friend Roebuck became bankrupt, and poor Watt imagined that all his hopes and prospects for the future were gone. But the idea of the steam-engine had entered the minds of other capitalists, and the celebrated Bolton, of the Soho Works, Birmingham, was readily induced to buy Roebuck's share in the engine, and henceforth Watt found in him an energetic partner, with all the resources of the celebrated factory of which he was the head at his service. This lucky removal for him, and for the civilised world, took place in the year 1774. The skilled hands of Soho speedily put the engine into thorough working order, and a patent right for the manufacture of steam-engines for twenty-four years was now obtained, after a good deal of opposition. In a short time, several pumping engines were at work in England, and the miners of Cornwall were anxiously awaiting their turn to try the new power of which they had heard so much. Upon its success depended the very existence of the deep mines of that county. It was, therefore, very important that there should be no failure in the first engine erected there. As it happened, the trial was to be made at Chacewater, one of the most celebrated mines of the county. The water had to be "forked" from a great depth; therefore the engine must be a very powerful one, and the greatest excitement was felt when it was first started. It went well and steadily, however, and pumped out more water than any of the old engines with one-third the consumption of coal. It also, to the intense delight of the populace, made a terrific noise—more than all the appliances then in existence in Cornwall would probably make together. Its performances in this direction, indeed, were regarded as the one test of its power. Watt set the engine to work more quietly, but the rude people of the county would not apparently believe in its power unless it thumped and seemed quite furious. The magnificent engines of the Great Eastern steamship move with the smoothness and silence of a giant's limbs. We have learned to look upon noise and jar as a sign of weakness in this mighty motive power, but in its early youth its accomplishments were differently viewed. The success of the Chacewater engines at once drove the old Newcomen engines from the field, and Watt and his partner had the task before them of supplying steam power, not only to the mines of Cornwall, but also to the whole of England. But a pumping engine which required only reciprocating, or up and down action, was not a form fitted for mill-work. The reciprocating action, therefore, had to be changed into a rotary one, which of course could have been easily done by fixing a rod to one end of the beam, turning a crank; but a cunning workman secretly took out a patent for this application to the steam-engine of a very old form of motion, much to the disgust of Watt, who never dreamed that such a trick would have been played him. The crank action being locked up, he set his wits to work to accomplish rotary motion in another way, and soon produced no less than five methods of doing it. The one selected, and which was applied to all his earlier engines, was what is termed the sun and planet friction. Watt escaped the penalty which but too generally falls upon great inventors. Instead of remaining obscure and poor, and being deprived of all the benefit of his brain-work by unscrupulous men of business, he died full of honour and years, busily engaged to his latest hour in various inventions, the last of which, the copying lathe, is now doing excellent service to the art of war, furnishing gun-stocks to the country he has made so wealthy by means of his great inventions in the arts of peace.

CO-OPERATIVE STORES.

As the retail tradesmen appear to be thoroughly roused by the new movement which threatens to put some check upon their profits, we must conclude that some of them must have experienced its influence.

This movement took its rise in London some five years since with the Post-office clerks of Saint Martin's-le-Grand. The first place of business was situated in Monkwell Street, City, with a branch in Villiers Street, Strand. Being confined entirely to the Post-office branch of the Civil Service, it was but little known. The Civil Service Co-operative Society, on the other hand, although primarily established for the advantage of that body, and managed by its members, who are admissible on payment of half-a-crown, which entitles them to a ticket of membership, by no means excludes outsiders; or rather, we should say, construes very liberally the term Civil Service, which they hold to include the members of both houses of Parliament, naval and military officers, clergymen, and their widows and orphans. The principle of the co-operative store is to get rid, as far as possible, of the expensive machinery of distribution which costs the tradesman so much, and which, of course, the customers have to pay for in the long run. There is no delivery of goods, to begin with. If the purchaser is willing to take his own purchases home, well and good; if not, an engagement has been entered into with the Parcels Delivery Company, by which they can be relieved of the burden on very reasonable terms. Knowing as we do the high rates this Company charges to the public, we can only conclude that it is the quantity they carry and the regularity of their work which enables them to call every day at the same store, and remove parcels to any part of the London delivery on the following terms:—Not exceeding fourteen pounds, threepence; twenty-eight pounds, fourpence; forty pounds, sixpence; fifty-six pounds, eightpence; eighty-four pounds, tenpence; one hundred and twelve pounds, one shilling. The goods are delivered in the course of the next day. It has been settled that the management can be conducted at a cost of not more than eight per cent. Every association has a price-list, and the housekeeper has only to compare the prices at the store with what he is accustomed to pay, to assure himself that he can make a great saving in his annual income. Paterfamilias well knows, if he has a tribe of children, how the money goes for the tea, the sugar, the butter, the cheese, the bacon—the matters which disappear so rapidly day by day, and make no show, but which sound his purse to its depths; and he finds that in the majority of cases it is these items which bear him to the ground, and make him think of his own little extra wants as things to be put off until his ship comes home; and it must be admitted that she is a shockingly slow craft, and but too often goes to the bottom instead of gladdening his eyes in port. Now a saving of say fifteen per cent. on these small trifles amounts to a very pretty sum at the end of the year, as many of the Civil Service members have found out.

It is a rule that but one class of goods is sold. The moment many different qualities are kept, the door is opened to all kinds of manœuvring. Of course, there are exceptions to this rule, such as tea, but there is no exception allowed to another rule, which is of still greater importance—no mixing of goods is allowed. To begin with, the mixing system prevents the public getting anything pure. If it is allowable to mix chicory with coffee, sawdust or burnt horse-beans may find their way in; or we may get chalk in the milk, or the hundred abominations we are hourly subjected to.

This security, however, only extends to the stores kept by the societies themselves, which are very varied, and embrace all kinds of dry goods and housekeeping articles—provisions, &c.—the matters in which mixings generally take place. There is a host of shops quite outside and irrespective of the stores, which are in alliance with them. Of course the principles which obtain in the associations cannot be enforced upon these tradesmen. The only advantage of their alliance is that they supply a wider range of articles than would be possible in the stores, and they allow a per-centage to members upon presentation of their tickets. It certainly strikes us that these allies of the stores are the weak points of these institutions. The Civil Service purchaser may be certain that he is a gainer upon his first purchase by the amount of the discount; but of course at the next deal the tradesman knows him, and what security has he that the magical per-centage is not put on to be taken off again? It even may prove to be the case that these allies at once, upon joining the association, raised their prices, in order to meet the ticket-holders. In such case the result would be to increase prices to every one—a most unlooked-for upshot of so-called co-operation. The managers of the stores tell us that upon any complaint from their members with respect to overcharges, they have it in their power to strike the offending tradesman off their books; but even then charges may be kept down, and articles still prove dear, from the purchaser's want of knowledge of the purity of the article supplied. In the matter of wine this would certainly be the case. Our advice to purchasers is, then, to stick to the store.

But why, asks the reader, can a store afford to sell at so much smaller a working profit than the tradesman? The reason, we think, lies in the fact that there is a superabundance of distributers or tradesmen, who have little or nothing to do. Of course, if there are ten grocers doing the business of one store, there must be a great loss of power on the part of the former: they have ten house-rents to pay instead of one, ten sets of shopmen, ten carts and horses; all these details, if not employed fully, are of course sources of loss to the master, which he covers by a commensurate profit. The advocates of free trade will say, This is all fair enough; if there are too many shops, the superfluous members will fail, and the balance will keep itself true. But in practice we know this is not the case. There is always a flood of small shopkeepers ready to rush in to fill up the places of the slain. It is like the case of the shirtmakers. The laws of free trade would say, The demand for that class of labour being in excess of the supply, the workers will seek other fields of employment; but we know this is not the fact. Necessity knows no law, not even the law of supply and demand, and the poor creatures rush to this pitiless kind of starvation to get what they call a living.

The shopkeepers are not only getting angry at the establishment of these stores, but they have the boldness to say they fly in the face of free trade. Surely the essence of free trade is to let every one go to the cheapest market; if he finds the store the cheapest, who shall say him nay? These stores, among other good purposes, serve as a check, so to speak, upon the tradesman. We thoroughly believe ourselves that tradesmen in certain lines of business combine to keep up prices. The butcher, to wit, will not, if he can help it, sell his meat under one shilling per pound; and the baker keeps up bread to ninepence halfpenny per quartern. These prices have been held up for a long time, notwithstanding that the causes which led to the original rise have been removed. A store where prices rise and fall with the markets will afford the public a good gauge of what prices ought to be—at least, as far as the ready-money purchaser goes. Where credit is concerned, the tradesman will have it all his own way, as of old, and we fear the credit-takers are in an overwhelming majority. At present the ready-money customer has to pay for the long credit-taker; this is not fair, and the only way to escape it is to join a co-operative association.

The anger of the tradesmen has led many of them to adopt a course which is anything but fair and above-board, and which smacks very much of the tactics of trades unions. The grocers, to wit, have combined to demand of many of the wholesale houses, that they cease to supply co-operative stores on pain of losing their own custom in case they refuse. In many cases the wholesale houses have been coerced into a compliance with this unjust demand; but the only effect upon the stores is to bring other wholesale houses into the market.

Some tradesmen seem to fear that this movement is only the beginning of the end, that it will terminate in the destruction of the shopkeeper altogether. This is a senseless alarm. Three or four shops more or less in this vast metropolis are scarcely worth talking about; they will supply an undoubted want: but if they were doubled or trebled their influence would not be felt to any extent. No doubt it is annoying for the shopkeeper who is standing idle at his door to see the crowds that frequent these stores, and to hear that they are doing (as we hear the Haymarket store is) eighteen hundred pounds a week; but they should imitate the tactics of the stores, and they will get the same custom. If a man sells a thousand umbrellas, let us say, in one day where another only sells ten, the former can afford to sell them much cheaper than the latter; it is the quantity that pays. This fact is well known to certain advertisers, who sell cheap, and of course sell fast.

We hear that the lawyers and the doctors are preparing to open stores on the principles of the Civil Service Association. There is a certain advantage in confining these co-operative societies to professions, inasmuch as their wants and tastes are more alike, and can be more easily met. We see that in the Civil Service Supply there is a professional list set apart from the trading list, in which we find the names of lawyers, doctors, dentists, stock-brokers, &c. It is not stated what discount is allowed by these latter gentlemen, but we are informed that "advantageous arrangements have been made with the professional officers of the society, particulars of which may be obtained on application at the office."

Besides the co-operative stores we have mentioned as being in existence, there is an association known as the Port of London Co-operative Association, supported by the clerks in the Custom House; and finally, there is the Commercial and General, which is open to any one, and is, indeed, a private speculation. No doubt, if these co-operative stores go on flourishing as they do at present, we shall have plenty of mere speculations of this kind on the part of private individuals. These, we fear, will depart from the original idea, for the purpose of filling private persons' pockets. A few errors of this kind will give a bad name to co-operative societies. Before taking tickets the public will do well to be cautious whom they trust. They have got hold of a good idea, and they should be careful lest they help designing men to run it to death. We would hope the genuine and well-established stores will avoid the vice of all similar institutions when they acquire any standing —namely, that of building and founding an establishment. Let the directors and managers avoid this error. The very essence of the wholesale store is to avoid fixed charges of any kind, beyond warehouse rent and warehousemen's wages. If it is determined to keep the expenses down to a sum that can be met by an eight per cent. return, all will be well; but woe be it to such concerns when the managers get wealthy, and when sums in hand begin to accumulate. The moment such an evil happens it is clear the members are beginning to be defrauded; for the store exists for them, and not they for the store.

THE ZOOLOGICAL GARDENS.

A PLEA FOR THE INHABITANTS.

WHEN we were children, the advent of Wombwell's Menagerie at the neighbouring fair was one of the great events of the year. To behold the actual beasts alive that we had been in the habit of seeing pictured in tales and nursery-books, was indeed a great treat; although we doubt whether the beasts themselves gained in our opinion by this personal verification, from the fact that a child's imagination, especially where the element of terror is concerned, paints pictures much more imposing than the real fact. A roaring lion, in a nursery tale, is a far more formidable beast than the same animal cooped up in a travelling caravan. The early menageries, therefore, somewhat took away from the boy's respect for wild beasts. They get so shockingly tame towards their keepers when they have to depend upon them for their food, that we begin to believe that they were not half so savage as they were made out to be—possibly in order to frighten naughty children. When, outside the caravan, we beheld the mighty boa-constrictor crushing a tiger in his voluminous folds, he was to be respected; but what terror could we feel for the same reptile when we saw his keeper allowing him to fold himself about his neck, and to creep inside his waistcoat? In short, Wombwell took very much of the poetry out of the wild creatures which the youthful mind always associated with scenes of savage life and hair-breadth escapes from peril.

When zoological gardens were first instituted, and it was determined to give wild things a local habitation, we copied too closely the idea of the menagerie. They were collections of dens, dispersed among shrubberies, it is true, but there was no attempt to give the creatures the slightest liberty, or to imitate the conditions surrounding them in a state of nature. We freely admit that with all delicate animals from tropical climates the question of temperature puts limits to these surroundings, excepting in the warm months of the year. Boxed up as they were, the lions and tigers, upon the first establishment of the Regent's Park Gardens, died from exposure to the weather at a terrible rate. Even now, with all the care we take of the monkey tribe, the more delicate among them are continually dying. Notwithstanding their houses are artificially warmed, a hard frost will kill scores of such tender nurslings in the course of a winter's night in this collection. But acknowledging the difficulties thrown in the way of tropical animals in the winter season, it seems to us that with regard to the animals of the colder and more temperate climates we have been backward in surrounding them, as far as possible, with the conditions they are accustomed to in a state of nature. When we have made the attempt, in nearly every case it has been successful. What information do we get from the beaver, for instance, when we see him in a box? but supply him with a pool of water and a bundle of sticks, and we are at once made acquainted with his habits; indeed, we know them more intimately within certain limits than do the Canadian trappers, for there is a keeper watching them all day, when they are at peace and without fear.

This and other successful experiments carried on at the Zoological Gardens, prove that such places of amusement may also be turned into most valuable places of instruction in natural history—instruction which Englishmen, colonising every quarter of the globe, will always find more or less valuable. Here, indeed, we may realise Lord Bacon's idea in the "Atlantis" of a "a tryal place for beasts and fishes." Here we may learn, as indeed we have done, to acclimatise many creatures, and thus to enlarge the store of food among us. In this sense a zoological garden ranks as a scientific laboratory, if we may so use the word, and not merely as a place of amusement, and a wonder-ground for holiday-folk. With this view we hope to see all zoological gardens established in the future take care to surround themselves with ample grounds; for it is this want, we fear, which is hampering the secretary of the Regent's Park Gardens in his labours to exhibit the animals in their natural state as far as possible. Let us take the "great cats," as they are called, the lions and tigers. These, the masters of the brute creation, were the animals that attracted the most attention in the old wild-beast shows, but it is far from being the case now, excepting at feeding time. The reason is obvious: the noble action of the felidæ is utterly unknown as long as they are boxed up in a cage not a dozen feet square. There is a paddock for the rhinoceros, and enclosures for the deer and giraffes, but the lordly lion can only be looked at through iron bars. Surely this is a mistake. Why should not he and the tigers and leopards have an open space, well palisaded, for their exercising ground? The animals would keep their health better, and the king of beasts would be restored to his right position, from which he has been deposed of late. Gordon Cumming tells us he is a sad coward; in other words, he did not find any one of them determined to eat him. He had many narrow escapes, nevertheless, and his servant was really munched up. He should, therefore, have been more grateful than to have disparaged the beast when he was at home in safety. We are inclined to indulge in our old faith in the lion, and there can be no manner of doubt as to his majestic appearance when in the open; therefore we trust the secretary of the Gardens will give him a play-ground, that we may see him in all his majesty.

There are two species of lions in the Gardens—the full-maned African beast from the Cape, and the maneless lion from Goojerat, in India. This is the lion of our heraldic shield, which looks so much like a leopard. Whenever water is an amusement it has been freely supplied. The hippopotami taking their baths were the attractions up to the present time, but the walrus and seals are now the stars. The former poor beast was captured in Davis Straits by the crew of a whaler, who, having destroyed the mother, were followed by the young one to the ship's side, where it was captured. Having been fed on salt pork during the voyage, it arrived very much out of condition, but it is now fast getting up its flesh. It would not be possible to give this amphibious animal a field of flat ice to rest upon, but why should its pool be surrounded with a parapet a couple of feet high? The awkwardness it exhibits in getting in and out of its bath, invariably rolling over during the latter process, is a sufficient proof of the inconvenience of the construction. The extreme ungainliness of the creature when walking can scarcely be imagined, especially when viewed from the hind quarters; it looks like a boy with his trousers half down scuffling along on his knees. Possibly, when it is a little fatter, it will not look so ugly; but at present it has anything but an elegant appearance, although it is doubtless excellently adapted for the condition of life in which it is placed. One peculiarity that attracts the visitor's notice, is the singular reticulated net-work of hair hanging from its upper lip, which is used by the animal in sorting its food, and sweeping it into its mouth. After it had been in the Gardens three weeks, it already knew its keeper, coming when called, and following him across the seal-paddock to its bed—a large packing-case of open boards, which must be exceedingly draughty in cold weather; but this is an inconvenience which does not disturb him.

The beaver, as we have said, teaches us his method of constructing his lodge. The power of his incisor-teeth was tested here upon a log of wood eight inches in diameter, which the male animal gnawed nearly through in an hour and a quarter, when it was taken from him, and is now shown as a specimen of his powers. The beaver is not a large animal; it must therefore surprise visitors to notice the size of the branches of trees it has used to construct the covering of its lodge. Some of these pieces are half a hundred-weight, and these it managed to drag from one side to the other of its enclosure. The branches having been interlaced together, the interstices were filled up with mud. The old idea that so amused children, that it used its tail to plaster its work, is now proved to be an invention. Its only purpose seems to be to give support to the animal when it sits on its hind quarters, and to serve as a rudder. To all intents and purposes the lodge is made just as it is in the native home of the animal. It has its different entrances and exits, and in the old house there were tunnels which led from the floor of the lodge to a water exit—a most necessary arrangement; but in the new quarters in which it is located, a deep circular wall is built in the inner ring of the pond where the lodge is constructed, which prevents this arrangement. The reason for this interference with the animal's instincts we do not know, unless it is a fear that they should burrow unseen under their lodge and escape as they did before from the Gardens. The cunning of these animals is so extreme, that it amounts to a reasoning power. For instance, every day they heap the sods that are put into the enclosure one upon another by the side of the fence, and if they were not as regularly removed, the animals would be over the wall in no time and off into the canal.

We suppose it would be impossible to give the space for a beaver dam, but if it could be managed it would certainly attract an immense deal of attention. In their native wilds, when located upon a swift stream, they manage to dam up the water on the most ingenious principles. They first fell a large amount of timber with their adze-like teeth, and with these logs they manage to construct a dam on truly scientific engineering principles, namely, with its apex pointed up the stream to resist pressure, and with its two sides gradually sloping towards either bank. By this means they obtain a space of still water to disport in. There was some intention years ago of providing them with the stream of water necessary to incite them to make this dam, but we fancy that a larger number than two beavers would be required to make this very elaborate structure, as, when wild, they always work at it in communities.

Whilst we are on the north side of the Gardens, we may look in upon the hippopotamus, as he lies in the water taking his ease, the upward curve of the orbits allowing him to see all that is going on whilst floating nearly wholly submerged. Both this animal and the rhinoceros are at times very ferocious, and the latter so much so that the sides of his den have been boarded off, and stairs constructed for the keeper to escape in case the beast should be suddenly seized with a paroxysm of passion. In the reptile house there has been a sad series of deaths among the chameleons, which have not been observed to change colour often, but merely to put on the tint of the ground upon which they were placed. The old ant-eater has also gone to his account, but two very fine specimens have lately been added to the collection. The mobility of this creature's tongue is really extraordinary: whilst we were watching him the keeper pointed out what appeared to be the tail of a mouse that played for an instant in and out of a very fine crevice. This was, in reality, the long, slender tongue, no bigger than a fine worm, seeking about for its prey. The food of the ant-eater is supposed to be ant-eggs, and as he cannot get these, he is supplied with ordinary eggs, beaten up with meat, on which he appears to flourish very well. The deer have been removed lately to the north side of the Gardens, but the elands still remain where they were. It was hoped some years since that these splendid animals of the deer species would have been naturalised in the parks of our gentry and nobility; but their temper seems to be uncertain, and in some seasons of the year they are, it appears, really dangerous. Otherwise their venison is very fine, and the size of the beasts is such as to afford very large quantities of it. The kangaroo is also spoken of as yielding flesh of fine quality, kangaroo steak being a well-known dainty in New Zealand; but this animal has an undesirable knack of ripping persons open with its powerful hind claws: a practice which, we fancy, will keep him out of gentlemen's parks, for which places, on his first introduction to this country, the animal was thought to be peculiarly suited.

On the south side of the gardens the monkeys seem to be furnished with the means of amusement very profusely; they have ample room and to spare in the large wire enclosure erected for them. The more delicate kinds—such as the Capuchin monkey, that used to amuse the company by cracking hard nuts with a stone—have died of lung disease; so has the Mona monkey; and the orang-outang and the old chimpanzees have gone the way of all flesh. But two new Chims have lately arrived, and, warned by past mishaps, these are taken during cold evenings into the keeper's room. It is the oddest sight in the world to see these two very human-looking creatures taken out of their cage and walking after their keeper, one with the arm round the other's neck like two schoolboys, and when they arrive in his room sitting before the fire warming themselves like old men—"our poor relations," as Samuel Rogers used to call them in his droll way.

The Cashmere goats, the same from which the shawl wool is obtained, are, we see, confined in a small paddock. Surely the instincts of the animal might have been consulted, and instead of placing them on a dead level, a little rock-work would have shown them to advantage and kept them in better health. In the Paris Gardens there is an arrangement of this kind which the nimble-footed goats seem to enjoy immensely. The director of our Gardens may take valuable hints from many of the foreign Zoological Gardens. For instance, at Antwerp there is a splendid aviary, in which the royal eagle may air himself without injury to his pinions; and at Cologne Bruin has something like a den—not a miserable pit with a solitary pole up which he has to climb before he can put himself on a level with civilised society, but an enclosure, with every convenience that a bear could desire. The fish-house at Hamburg, again, is on a magnificent scale. The walls of the house are composed of glass tanks, which, being between the spectator and the light, show off the fish to great advantage. No doubt a want of money prevents the superintendent of the Gardens from making many of the improvements we have mentioned, which would at the same time conduce to the health of the animals and to the amusement of the spectators. The expenses of the establishment are very large, not only in the item of food, but also in keeping up a supply of animals. There can be no doubt that, situated as these Gardens are upon the clay, with a canal running along its north side, they are very damp, which causes a great mortality in the animals, some of which are very valuable, and this loss causes a great drain upon the funds of the society. Nevertheless, we think that much may still be done at a very inconsiderable outlay which would make these Gardens the most perfect "tryal place for beasts and fishes" that has yet been established.

THE MANUFACTURE OF PERFUMES, AND THE FLOWER FARMS OF EUROPE.

The manufacture of perfumes in England, with one or two exceptions, is a thing entirely of the present century. Of old we went to France for all these refinements of the toilet, and to this day the best-known among them go by French names. There used to be among Englishmen a very sneering appreciation of odours as a personal adornment. Of old they were thought to be only fit for Frenchmen, and that was in itself a sufficient stigma to keep them out of general use. The world has grown wiser during these last thirty or forty years, and it is no longer considered effeminate to cultivate the organ of smell, as well as that of colour or sound. Why should we not? Among the animal creation it is a sense exquisitely developed. Watch the delicate tentative process by which the higher order of animals inquire respecting a strange acquaintance by means of the nose—two horses, for instance, warily approaching each other in a meadow. Human beings, it is true, do not require the protection of this sense, but to ignore it on the score of its being effeminate is to depreciate one of the gifts of the

Almighty. And there is danger in it also; the nose that cannot appreciate a fair smell cannot detect a foul one, and may contract disease in consequence. But the present generation cannot afford, we think, to throw over the argument respecting its effeminacy. We question if one person in a hundred who passes a perfumer's shop has any idea of the manner in which the delicate emanations of flowers are permanently caught and secured for the use of the toilet. They are not even aware of the large capital employed in their growth. Possibly some traveller past Mitcham, in the neighbourhood of the metropolis, has noticed the large fields of lavender through which he is travelling; but it does not strike him that these are farms for the growth of flowers to fill our dressing-cases with perfumes, as there are farms to grow wheat for our food. In England, with trifling exceptions, our cold climate can grow no flowers that are commercially successful but the lavender and peppermint; these two, however, we produce better than any other nation: hence these odours are considered an English speciality.

The flower farms for the more delicate blooms—such as jasmine, rose, tuberose, and orange-flowers—are situated in the south of France, at Cannes, Grasse, and Nice. The hill-sides of these neighbourhoods, in the proper season, are one mass of flowers, exhaling a most delicate perfume. The odours and essential oils are gathered from flowers and fruits by many different methods. For instance, orange, lemon, and citron peel are placed in a press, and by mere mechanical action made to yield up the essential oil which resides in the small pellicle of the rind. The art of distillation, very largely used, need not be described, but the singular art of obtaining perfumes by absorption is not so generally known. Many of the more delicate odours are so volatile, that the use of heat, as in distillation or maceration, spoils them; it is, therefore, necessary to conduct the process cold. Possibly, the grossest material matter we have any notion of is fat, and the most spiritual the delicate odours of flowers. That two such very different matters, if we may use the word, should have any affinity to each other does not at first sight appear natural; but when we remember the large proportion of carbon in fat, and that carbon has an especial power of absorbing all gases and essences, we get at the rationale of the absorption or enflowerage process. The odours so liable to escape on the application of heat are very effectually trapped and secured in the following manner:—Square wooden frames about three inches deep are filled with glass bottoms, about two feet wide and a yard long. Over the glass a thin layer of fat is spread with a spatula. Upon this bed the flowers, the odours of which are to be absorbed, are spread thickly, and allowed to remain from twelve to seventy-two hours. These *chasses en ver*, as they are called, are made to fit one upon the other, and in some large houses thousands may be seen thus piled, silently at work securing the odours. The flowers are continually changed throughout the season, and in the end the fat is completely saturated with their perfume.

Thus the finer-scented pomatums are made; but when it is required to secure the perfume as an essence, the fat thus saturated with perfume is cut into small cubes and placed in spirit, which speedily steals back, by its greater attraction, the odour from the hydrocarbon.

The author of an amusing and instructive work on perfumery asks why ladies should not cultivate flowers for their scent as well as for their colour, and he suggests a means of obtaining heliotrope pomade which any person may put in practice. An ordinary glue pot, made thoroughly clean, is, in fact, a *bain Marie* on a small scale. Place in the pot a pound of fine lard, and when the heliotrope flowers are in season, throw them into this clarified fat. Place the glue pot near the fire of the greenhouse, so as just to liquefy the lard. Let the flowers remain in the liquid for twenty-four hours, strain the fat from the spent flowers, and go on repeating the operation for a week: the result will be *pommade à la héliotrope.* The pomade can be made into an extract by steeping the odorous fat in highly-rectified spirits. In this manner a young lady may make her own perfumes—an amusement quite as interesting and more useful than doing crochet, or the hundred odd ways young ladies have of killing time in the country; and, we may observe, in this manner she may get her perfumes pure, which is far from being the case at present. Let us take extract of heliotrope, for instance, as it is sold in the shops. There is not one particle of the flower in it: vanilla, French rose, orange-flower, ambergris, and the essential oil of almonds, mixed together in certain proportions, make the imitation known by the name of extract of heliotrope. This, in its way, is a fraud as bad as those committed at Cette, in France, where they manufacture wine from half-a-dozen different sources, not one drop of the pure wine the mixture is intended to represent appearing in it. Imitation of honeysuckle is made up in the same way. Indeed, some of the odours in use are made from the most repulsive-smelling substances. For instance, there is the artificial otto of almonds, which is made from benzole, or tar oil. Extracts of myrtle, narcissus, lily of the valley, and several others, are all innocent of containing the odour of the perfume they are made to represent.

Orange-flower extract is, on the other hand, made from the blossom of that flower in the same way as the heliotrope extract.

Otto of roses is made by distilling the roses with water. Farms of this flower of a large size exist at Adrianople, at Broussa, and also at Ghazepore, in India. Very large numbers of roses are used to make the otto—as many as two thousand blooms to make one drachm. Different districts vary much in the nature of the otto they produce: it depends, in fact, upon the nature of the flower. In the Exhibition of 1851 we are informed that the otto from Ghazepore obtained the highest prize.

Roses are cultivated near Mitcham, in Surrey, for the purpose of making rose-water. In June and July they are gathered in sacks and sent to London, where they are pickled, or rubbed in with salt, which absorbs the water and reduces the whole to a pasty mass, which is then stowed away, and will keep for any length of time.

Musk, a strong odour procured from the musk-deer, is very largely used indeed in the manufacture of bouquets. As a rule, English ladies object to it, although we are told that the Empress Josephine was so fond of it, that, notwithstanding the Emperor's remonstrances, her dressing-room at Malmaison was filled with it; the perfume not having to the present time been obliterated, notwithstanding all the means taken to do so. To return to our own tastes, however. The perfumer, notwithstanding the objections made to musk, knows that it must be used to meet the national taste, which is for a delicate and a persistent perfume—two qualities which are entirely antagonistic to each other.

The best musk comes from Tonquin and Thibet, but the deer is found throughout the whole length of the Himalayan chain. The scent is found beneath the skin and near the navel of the animal, which is not bigger than a greyhound, and is often caught in snares, though it is generally hunted as we do hares. Some of the Chinese pictures, indeed, of the chase of this valuable animal, depict the Thibetians killing it with the bow and arrow. Musk, in its pure unadulterated state, is disagreeably powerful—indeed, there are many perfumes of vegetable production which we should exceedingly dislike if used in their pure condition, especially the ottos. That of violets, for instance, is like prussic acid, and the otto of roses is very disagreeable. In nature we know nothing of this, because the breeze presents the odour to us in infinitesimally small proportions; and the perfumer, imitating nature by the addition of spirit to the concentrated otto, distributes it again in gentle exhalations. If the otto of jasmine, indeed, were used, only princes could buy it. The perfumer stores it in tiny little bottles, and tells you that it is worth nine guineas an ounce.

The art of the perfumer is shown in delicately combining different scents. When we walk in a garden the delicious odours that greet us are by no means the emanations of one flower. All the blooms of the garden, more or less, add to the general harmony that strikes so gratefully upon the olfactory nerves; they reach us in such infinitely small particles, that no one scent overpowers the other. When art attempts to imitate the diluting effect of the breeze, she has to be more circumspect. Only odours of a similar octave, as a recent writer has pointed out, will agree with each other. Another authority, indeed, has elaborated this idea, and has composed a perfect gamut of odours, beginning with civet, verbena, and citronella in the treble clef, and ending with wallflower, vanilla, and patchouly in the bass clef. The ingenious originator of this idea well remarks: "The odours have to be remembered, and it is noteworthy to remark that odours do fix themselves upon the memory; and were it not for this remembrance of an odour, the merchants in the trades indicated would soon be at fault." These dealers, on the strength of their olfactory nerves, often make purchases amounting to thousands. The tea-merchant, the tobacco-dealer, or the hop-merchant takes one sniff at the commodity in which he deals, and makes his purchase without fault. The writer quoted goes on to say, "An experienced perfumer will have two hundred odours in his laboratory, and can distinguish every one by name. Could a musician, with an instrument of two hundred notes, distinguish and name every note struck without his seeing the instrument?" Every person, from his own experience, can testify to another quality which scent in common with sound possesses: we allude to the power it has of recalling to the mind's eye the scenes of long past years. The mere breath of a perfume will often call up an event, with all its minutiæ, which had long lain dormant in our memory.

The composition of bouquets may, indeed, be considered a fine art, viewed by the light in which we regard it; but then scent is an individual thing. The perfume that suits the blonde by no means agrees with a brunette. There are differences of temperament, again, which require differences of perfume. To meet a young lady of a poetical, spirituelle temperament smelling of musk, would give a shock to any person of delicate tastes; whereas a strong, healthy country-woman, if she selected any perfume at all, would do best to use this powerful animal odour. It must be noticed that in music we select those airs which are consonant with our own temperament. Why should we not employ our own instincts in selecting perfumes? As it is, we are the mere slaves of fashion: because the Empress Eugénie uses a certain bouquet, every shop-girl that can afford it does the same—or rather she gets some sham article, which is palmed off upon her for the real thing. And this is the easier, inasmuch as some flower-odours that are plentiful very much resemble those that are expensive. The syringa, for instance, is grown in America for making an odour resembling that of orange-blossom. A great deal of this sham essence is, indeed, used in France for making orange pomatum.

But there are numbers of odours that are made from various substances which the public know nothing about. If we were to question the next hundred persons we meet in the street as to the source from which ambergris comes, we do not think one of them would know anything about it. Its name indicates some alliance to amber—amber-gris meaning grey amber. But the only reason for this idea is that, like the gum, it is found floating in the sea, though in south-eastern latitudes. It is said to be found in the intestines of the spermaceti whale, and there is some evidence in confirmation of this theory. In breaking up masses of ambergris perfect specimens of the beak or snout of the cuttle-fish, upon which the ambergris whale is known to feed, have been found. It is probable from this that this extensive perfume is nothing but the excreta of a whale.

Patchouly, a herb that grows in India and China, affords an essence which is at present very fashionable. The odour came to our knowledge in a roundabout manner. Not long since it was the custom of shawl purchasers to distinguish real India shawls from the very clever French imitations, by the delicate odour they emitted. This odour our friends across the water could not imitate. They however set their wits to work to find out the secret, and succeeded in importing the patchouly plant, for the purpose of giving the characteristic perfume which enabled them once more to palm off the fictitious for the real shawl. This fact speedily leaked out, and no dealer now trusts to his nose to settle the question between a real Indian shawl and its French imitation. The plant once in Europe, however, it speedily became a favourite. It is used by the Indian shawl merchant to preserve his goods from the attacks of insects; it is therefore applicable to the preservation of all kinds of linen and woollen garments.

There are a score of scents which we know nothing about. The geranium may perhaps be familiar—it is expressed from the leaves and the stalk; but what do the public know of the extract of cedar? We know that the cedar is an odorous wood, but the perfume has only lately been known, it having been made for the first time within these few years from the refuse shavings of the pencil makers. What, again, do we know of the essence of cucumbers? That this salad has a delicate smell, with which many a happy pic-nic is associated, we all of us know; but of late years the perfumer has found a use for it for the nose as well as for the mouth. Fennel is not a substance from which we should expect to find an odour extracted, but the oil is used to scent soap, we find, for those who like it.

There are numbers of these chemically built up essences now produced, and not only the perfumer, but the confectioner is adding to his stock of tastes and perfumes by reason of the labours of the chemist. There is no knowing what art may not do hereafter, now our chemists are becoming so clever. Possibly, in a dozen years' time flowers will be deposed from the laboratory of the perfumer, and, by the magic art of chemistry, the most disgusting odours will be transformed into the most delightful perfumes.

POISONOUS SEWER GAS—THE WAY IT IS LAID ON.

CAN any one tell us why it is that if a plumber is called on to do any odd job he always brings a man with him? A carpenter or a bricklayer can work by himself, but the plumber, we are informed, will not work without a man in attendance, whether his services are required or not. We make this inquiry for the reason that we think the public have a right to complain of this handicraftsman, whose ignorance and inefficiency are only equalled by the rapaciousness of his charges, or by his skill in making future jobs for himself. The mishap that some years since prostrated the Prince of Wales with typhoid fever, opened our eyes to the fact that we have imprisoned beneath our houses a deadly poisoner, for ever striving to find us out, attacking us through the water we drink and through the air we breathe; laying low generally those in the most robust health, the youngest, the brightest, those upon whom the lance of death, in the ordinary course of things, should be the last to fall. The deadly sewer gas, that monster we have created for ourselves, and by the cunning contrivance of the plumber brought into our very chambers and into our water tanks, is the sanitary enemy every man feels to be now at his door, and he is beginning to lose all confidence in the delusive contrivances to keep it out.

Let us frankly admit the sanitary engineers, as well as plumbers, have been tested and found wanting. In our cities, the construction of a vast system of sewers has been settled without any arrangement for their thorough ventilation. The consequence is that an enormous quantity of sewer gas is always collected beneath our feet—a gas far more subtle than that we burn, taking such care to prevent its escape because it is expensive—yet a gas we deliberately lay on close to our bedrooms, and allow to escape at pleasure; for the water traps with which the plumbers furnish our closets are the merest delusions and shams. Wherever there is a river or a sea, the mouths of such sewer systems are invariably placed on the margin of its waters, to be covered or left open as the tide ebbs or flows. The inevitable result of this arrangement may be imagined. In the great Exhibition of this year a very clever model was shown by a Frenchman of a method by which the rise and fall of tides was shown to be capable of being utilised as a source of motion—in short, a means of exhausting and condensing the air. Those who saw this singular contrivance little thought that our sanitary engineers had already utilised this enormous power to do—what does our reader think?—to pump sewer gas at every tide into our sea-side houses; for it must be evident to every one that the pressure of the sea water in the open drain pipe can have no other effect than to drive the sewer gas through the drainage pipes, or through the water traps the plumber's bungling ingenuity could contrive. That sewer openings into the sea, and tidal rivers, are thus made sewer engines to pump the death-dealing gas into the houses connected with them there can be no manner of doubt. When the tide, moreover, is not exerting its pressure, the wind, if it blow into the sewer exit, is equally efficacious in driving the gas through the traps; as we are informed that on one occasion it rushed upwards with such force as to blow out a candle exposed to its blast, whilst some repairs were being done to one of the traps. Even where gentlemen's houses are inland, and not exposed to this sea-side danger, they are liable to others equally deplorable. As a rule the mansion is placed on rising ground; the brow of some breezy hill is generally selected, for the sake of the purity of the air. In such case the cesspool of the establishment is placed on lower ground, to give the necessary degree of fall to the drain. But although the sewage by gravitation descends, its gases ascend, hence the cesspool is nothing more than a retort for the distillation of a deadly poison, of which the necks are in the dwelling-house, close to the bedrooms. When we remember these things, have we not reason to dread the clumsy contrivances of the plumber, who may be said to hold the keys of life and death in his hands? A little solder wanting, a badly-made joint, and the mephitic vapour enters our rooms and subtly kills! And may we not have still greater reason to complain of the fearful ignorance of our sanitary engineers, who expose us, by their want of scientific knowledge, to such dreadful consequences? How can we be sure of the reports of safety from such sources, when we remember that special agents have declared various sewers to be in perfect condition, the very reverse being the fact, according to the researches by really skilled men?

It is not quite certain in this particular instance, which has brought the gravity of the matter so before the public, whether the typhoid attack of the Prince of Wales was brought on by foul air or foul water. In all probability sewer gas received into the lungs was the cause, inasmuch as we are given to understand that the water was supplied by the Scarborough Company. If this water had been universally poisoned, it must more or less have affected the whole water-drinking population of that town; but we must remind our readers that there are special methods of water-poisoning in every household, of which, unfortunately, they are in most cases in total ignorance. A dead rat in a water-tank is sufficient to poison water; but this is a cause which on inspection too clearly declares itself. There is another cause to which every household is liable—the poisoning of the water by sewer gas. Most householders are aware that in every cistern supplied by a water company there is what is termed an overflow pipe, provided to conduct away the water in case the ball-cock should fail to shut the supply off when the cistern is full; but *it is not so well known that this over-*

flow pipe runs down into the drain, and the consequence is that it forms a conducting tube through which the gas ascends directly into the supply tank. As this tank is, in London at least, generally in the roof, the consequence is that in the winter the gas, immediately it is given off, is condensed and falls down upon the water, where it is absorbed. In this manner isolated cases of typhoid fever may be accounted for in healthy neighbourhoods drinking perfectly healthy water. We cannot too strongly beg our readers, in all cases whether in town or country, to see that such waste pipes are not sealed into the sewer system, or into any pipes leading to a cesspool. Moreover, they should see that the cesspools themselves are removed away from the neighbourhood of the house and from proximity to any well. It but too often happens that in a sandy porous soil the cesspool and the well are near together, and as the former is generally built up with loose bricks, without any mortar or cement, to allow the liquid to drain off easily, its immediate surrounding earth becomes sodden with excrement, which percolates to the well. How many a cottage do we see in the country, embowered in honeysuckle and clematis, the abode apparently of the goddess of health herself, whilst in fact it is honeycombed with fetid drains often beneath the floors of the rooms; whilst the water which the thirsty traveller quaffs with such delight from the deep draw-well, so cool and sparkling that it looks like purity itself, is impregnated with poison from the same deadly source! Let us warn our readers to beware of those mossy wells, fern-grown and cool, within a handy distance of these bowers of rural felicity.

Nothing is more certain than the fact that the poisonous nature of the gas given off from excremental matter is rendered deadly by being confined within walls. Any amount of sewage matter open to the air is, comparatively speaking, innocuous; dilution with oxygen renders it perfectly harmless. For this reason cesspools should have openings through which the noxious vapours may be dispersed in the air. A pipe carried up a tree would thus perfectly purify a cesspool, without giving off any unpleasant odour. Before the present water-closets were invented, and indeed in the poorer cottages where they are unknown, the middens in the old rickety out-houses, in consequence of the abundant admission of air, are perfectly healthy, and foster no seed germs for the propagation of a fatal disorder.

So much for the country districts. If we now recur to the great cities, where the drainage is generally into rivers, the pollution of the water is a growing evil that the Legislature is but too tardily attempting to remedy. Even the Thames, notwithstanding the care to carry its sewage to the sea, is becoming polluted both at its mouth and high up towards its source. The sewage is only allowed to pass off through flood-gates when the tide is going down, and it is supposed by engineers that it is carried out seaward and is there got rid of; but in reality it but too often returns with the tide, as those who journey low down the river are well aware. It is true that this water does not contaminate the sources of our drinking supply gathered above Teddington Lock; but this water is also year by year becoming polluted by the towns and villages draining into it, of which Windsor and Oxford are notorious examples. What is true of London, in the sense of the pollution of its waters, is going on in many other large cities and towns. In the very largest cities we may note a new difficulty, which has arisen in consequence of the rapid extension of building that is incessantly going on outside of their drainage systems. Let us take London as a typical example, which has spread its map out in so astounding a manner during these last ten years. Within that period the mighty metropolis has become surrounded with a belt of residential houses, wholly outside the drainage scheme. With respect to this cesspool-infested belt, the Registrar-General in a late Census Report thus significantly remarks :—

"The population of the ring around the district of the Metropolitan Board of Works has increased 4·19 per cent. per annum, or more than fifty per cent. in ten years, and, there being no adequate provision for the sanitary imperfections of this area, which is shut out from the system of sewers lately created, is *in imminent danger.*"

This ring of cesspool-soddened earth which is coiling its deadly folds around the metropolis, if not speedily obliterated, may spread a plague amongst us as deadly as any Londoners suffered from during the Middle Ages.

Bristol, which engages to collect and cart away this solid manure free of charge. Let us then try this scheme in the London suburbs, where the need is the greatest. Much as we may smile at the follies of the Chinese, in this question of sewage they have been from time immemorial far in advance of European nations. Instead of looking upon sewage as a nuisance to be got rid of at an immense expense, by an artificial system which ruins it and our own health at the same time, they allow nature to do the work, and for centuries have supported from their soil a population per square mile with which that of any other European country cannot compare.

If our system of sewers in the midst of our dense cities is to continue, the labours of the sanitary engineers must without delay be directed to their thorough ventilation. Numerous suggestions have, we are aware, been already made to this end. It has been proposed, for instance, that sewers should be ventilated like coal mines, by means of large fires at the mouths of tall chimneys, which shall draw the vapours upwards and then purify them by fire. Again, it has been frequently suggested that all factory chimneys should be laid under contribution for this purpose, a proposal which would not do much for the West End of London, for example. Again, it has been proposed to carry pipes from the main sewers to all the street gas-lamps, but we fear the lights would resent this treatment, and place the streets by night in darkness that could be smelt. The water-pipes have likewise been proposed to drain off the gas, but no scheme yet suggested is sufficient to meet the evil; but we doubt not that the late threatened danger to a valuable life, at a moment like the present, will force the Parliament to consider some sanitary law having for its purpose the elimination of one of the most fatal forms of fever that we have deliberately manufactured for our own destruction.

LADIES' TRESSES.

THE CHIGNON AS AN ARTICLE OF COMMERCE.

THE fashion of wearing false hair has become so universal, that the exception of the few persons contented with the crop Nature has supplied simply serves to prove the rule. Those who do not adopt a whole chignon will wear part of one, or bring a simple plait into requisition. Even ladies who profess to scorn such additions insert a few surreptitious "frisettes" to shape their head-tire. These frisettes are made also of hair. The best are constructed of human hair, the inferior of silk. If we consider that even a moderate-sized "plait" contains as much hair as grows altogether on the head of an ordinary Englishwoman, and is probably half as long again, and that a handsome plaited chignon contains such a quantity as only what we term "a beautiful head of hair" would furnish, we may very reasonably be allowed to wonder whence the supply comes. Our statement, that a "plait" contains as much hair as grows altogether on an ordinary head, and is half as long again as most, will probably be received incredulously by some of our readers, indignantly by others.

But let any lady tightly tie her hair together at the back of her head, after the usual mode, preparatory to arranging it; let her then handle its substance, closely compressed as it is, and compare it with the substance of the hair used to make her plait, which we will suppose is now unplaited for examination; let her hold the top of the plait to the tied part of her own hair, and contrast the length; let her hold up each in her hands to judge of the respective weight; so she may arrive at an estimate of the market value of her own hair. If equally long, and equally thick, and equally heavy with the false piece, it will be worth about one-third of the price, the difference being allowed for the expenses of cleansing, making-up, and the profits to the trade. The hair at the sides of the face, commonly called by ladies "the front hair," is generally too short to be reckoned at all. But, to return to our former inquiry, Whence comes the supply to meet such a demand? How is it that two-thirds of the women of the present generation in England, France, America, and in all the fashionable circles of Europe and India, are able to wear twice as much of it as they themselves produce, not to mention wigs masculine of all kinds?

Hair is imported into this country from Germany, Italy, and France. A very little sometimes comes from Sweden and Spain. The trade in false hair has increased, during the last ten years, tenfold. Now about £100,000 worth of hair is annually imported into the market, which, when sold retail, realises three times the cost price of "the raw material;" that is to say, in England alone about £300,000 was spent, say, last year, in the purchase of false hair. When we remember that a plait, or chignon, can be worn for many years, and at best only newly re-arranged or cleaned and re-made, we obtain some idea of the immense quantity of false hair actually in wear. It must be remembered, however, that numbers of country ladies have two sets, for the convenience of transmitting one set at a time to London to be dressed, for which purpose they sometimes arrange to make an annual inclusive payment. Some fashionable women, and most actresses, have a variety of chignons, curls, plaits, &c., dressed in different modes, to afford them a change of head-dress at pleasure.

The hair is obtained by travelling hair merchants, who visit towns and villages on the Continent annually, and purchase all that is offered to them. With the peasant-girls of several countries, the annual sale of their hair is a regular institution, and even more generally followed out than the autumnal sea-bathing of our upper ten. In Germany the peasants invariably wear a handkerchief tied over the head, like the women in Ireland, and all that is seen of the natural covering is a coil at the back, partly discernible under the handkerchief. When the hair merchant comes round, the girls all let down their hair, which at other times they do not trouble themselves very frequently to brush or comb; and where it is so abundant and long it is troublesome, and can be dispensed with cheerfully.

They do not usually suffer the whole to be cut off, but only half or two-thirds; the remainder is quite sufficient to twist up into a neat coil behind, and therefore their appearance is by no means injured by the sale. If pressed by extreme poverty they will often sell the whole—not otherwise; and even that sacrifice does not seem a hard one to those who are accustomed to see every girl they know sell at least half her crop of hair. It is no more a cruel infliction in their estimation, than the piercing of ears is amongst us; but even the sales of hair in this manner would not meet the demand, if the growth were as slow as it usually is amongst English ladies, with whom the common average length is eighteen to twenty-two inches. The hair which reaches us from Germany is not less than twenty-four to thirty inches in the shortest pieces, and a yard long is by no means an extraordinary crop. The Italian hair grows longer than the German. In warm countries it grows a great deal more rapidly and abundantly than in colder climates, and it is said to be much more ample amongst the peasants than amongst the gentry—probably because of their more robust constitutions, the more active and natural life which they lead, and the absence of straining and ligatures, used to dress hair fashionably, which tends greatly to break and impoverish its growth. The hair of the peasants grows so rapidly, that each year they are prepared to part with an abundant crop.

At the present moment the chief demand is for German hair. From Germany comes every shade from flaxen to a dark brown; but the brown is quite different from the Italian brown. It is not so dark, and has a reddish or golden cast in the parts where the light specially rests. The chief present trade is in all shades of golden, light, and red hair, for the custom of extracting the natural colour of the hair prevails to a very great extent. Italian hair is of a very dark brown, approaching black, very long, soft, and of delicate texture. It is obtained, like the German, by annual sales made by the peasantry. In all parts of France also the sale of the hair is customary; but there is little demand here for the French hair—it is short and coarse, and useful chiefly for frisette-making. Its dark colour, also, creates for it but a small demand.

There is very little hair purchased in England. What is sold comes principally from the convents, and is not long enough to be valuable.

Grey and white hair is the most costly of all kinds. It is difficult to obtain it of any length. As long as a woman remains in the prime of life, her hair continues to grow long. Sickness and age render it brittle; it breaks off, and never attains to great length. In age, when the hair is white, it is usually also very short.

When cut from the head by the travelling merchant, the hair is just placed regularly together at the top, and a wisp drawn out from it is twisted round the top, making a kind of hank. Several of these are tied together. The importers of hair in this country receive large sacks filled as full as possible with such bunches of hair. When the bag from Germany is opened, every shade of tawny and golden brown is visible in a rich variegated mass. The bag from Italy, on the contrary, contains one uniform silken dark brown, almost black, and as even in tone as if it had been dyed. It is a curious fact that all the tawny and golden shades present a considerable variety of tone and colour in the same head of hair, and the roots are usually of a totally different colour, a sort of dead ash colour, or drab. The centre of the length will be nut-brown, or tawny, or red, and the tips as sunny as if dipped in some liquid gold. Even the dark brown shades vary to a great extent, and present streaks of shade and lighter tips. Some persons are apt to fancy, if they see variety of colour in a lady's hair, that they are detecting the admixture of false hair; but this observation proves that it is no criterion.

Many ladies, especially those wearing dark hair, discover after a time that the chignon or plait no longer matches their own in colour. The reason is that false hair gradually wears lighter, from the action upon it of air and light; it also wears out after some years' use. This is consequent upon its being dead, and no longer receiving a constant supply of fresh nourishment as it does whilst growing.

The hair, when it arrives in sacks from abroad, is dirty and ill-smelling, but as soon as it is unpacked, it undergoes a thorough process of cleansing. Mr. Hovenden, one of our largest hair importers, kindly permitted us to inspect the process of cleaning and preparing the hair for sale. There are two methods for the preliminary cleaning. One of these is washing it very completely in soap and water; or, instead of washing it, the hair is placed in a large flat trough of sand, and rubbed about in the sand until every particle of grease is removed. The efficiency of this sand-cleansing may be tested by the fact that, after being used awhile, the sand becomes saturated with the grease, and clogged together almost in a paste.

After the hair is freed from grease, each knot or crop of hair being treated separately, it is then passed through and through a brush for a considerable time. This "brush," as it is technically called, is a piece of wood about a foot square, furnished on one side with steel teeth two inches long, large, strong, and far apart. The brush is fixed to a table, teeth upwards, and the hair drawn through it. It is next passed in the same manner through a "comb." This instrument is precisely similar to the "brush," with the addition that in front of it there is fixed a steel small-tooth comb, through which the hair must also pass. A second comb, still finer, is used to complete the cleansing process.

Next the hair is sorted in lengths. To accomplish this, a couple of bristle brushes, each a foot and a half long, and about eight inches wide, are laid on the table with the bristles together, and the top of the hair untied and spread along between them. A heavy piece of lead is laid on the top of the brushes to keep them steady, and to make them hold the hair securely. A man then continuously combs off the longest ends till he has a thick tress in his hands, which he ties round at the top, and continues his work, making tress after tress. When the crop of hair in hand is completed in this way, he places each tress separately between the brushes, and combs it again from the other end, again making each piece into a separate hank. Lastly, the hair is sorted in lengths of a colour, and bound up neatly in pound-weight pieces with pink tape.

Before closing our article on hair, we cannot help taking notice of two very remarkable specimens of hair kindly shown to us by Mr. Hovenden, and probably not to be matched in the world. The first was a light nut-brown tress of great thickness, and two yards in length. It came from Germany. The second was a single lock of dark-brown hair, cut from the head of an English girl, and two yards and two inches long. Such hair on the head of the original owners must literally have trailed upon the ground as they stood upright.

GREAT MACHINE TOOL-MAKERS.

William Fairbairn, the celebrated machinist, has left it on record that when he commenced his career at the beginning of the century, the human hand performed all the work that was done. In these days such a statement seems very strange, and the wonder is, how the craftsmen of the days of our fathers managed to get through the work they did. At the present time, in the vast majority of occupations, we have reversed the old order of things, and machinery may now be said to have superseded the use of the ten fingers, in most cases where rapidity and cheapness of manufacture are required. It is said that the first person who invented labour-saving machines was Bramah, the maker of the patent lock. He found it necessary to give the greatest exactness to every part of the ward and key of this celebrated lock. This he found very difficult to do without employing the very best workmen, and their charges were so exorbitant, that his invention was in a fair way of dropping out of use on account of expense. In this dilemma he was forced to turn his attention to the introduction of machinery to produce with unerring nicety the different parts of the complicated little apparatus with which his name is yet associated. The workshop in which the many clever contrivances to perform this work with speed were invented, may be said to have been the training-school for the early machinists, whose labours have within the present century built up the mechanical greatness of England. Accuracy of machine-work before his day was utterly unknown. Watt had the greatest difficulty in getting his first model of the steam-engine constructed with sufficient truth to work; its cylinder was not bored but hammered, and consequently was so imperfect that it leaked in every direction, and when his "old white-iron man" died, he was plunged into despair to obtain another skilled man. Even when he had obtained the trained workmen of the Soho Foundry they found a difficulty at first in constructing working engines after his design. The accuracy and quality of the best workmen of the day may be gauged by what he says of the working of his steam-engine:—"The velocity, violence, magnitude, and horrible noise of the engine give universal satisfaction to all beholders—believers or not." What a contrast this to the smooth, irresistible, noiseless action of a steam-engine of the present day, constructed with mathematical accuracy and perfect finish. But to attain these qualities machinery had to be constructed in a wholly different manner to the methods pursued by the old smiths. Every step, in fact, had to be built up. The invention of the famous fixed slide-rest by Maudslay, the journeyman, who learnt his trade with Bramah, was the first step in a series of inventions leading towards the same end. Before its invention, the turning-lathe depended for its accuracy upon the steadiness of the muscles of the workman. If at any moment, in turning a cylinder, for instance, he leaned heavier upon the tool than another, the whole work had to be gone over again. By simply fixing the turning tool, however, this cause of error was entirely obviated, and mathematical accuracy of workmanship was obtained. Maudslay was the man who executed from the drawings of the elder Brunel the series of labour-saving machines at present in work in Portsmouth Dockyard, for the manufacture of ships' blocks. These ingenious machines, forty-six in number, were only a few years ago the curiosities of the place, and may be, for aught we know, yet. They were the first ever set up in a public yard, and although they have been at work for sixty years they remain still in capital working order. Maudslay afterwards, in conjunction with his partner Field, founded in Lambeth Marsh the famous firm which is still carried on under their names. This firm has done much towards training the splendid machinists which have made English work so famous throughout the world. We are told, indeed, that Belgium is running us hard in this kind of work—at all events, she is under-selling us in cheap locomotives; but we do not fear that any nation will excel us in really conscientious work. We are told, and we believe it, that first-class machine-makers cannot afford to turn out any but first-class work.

Clements was another inventor who learned his art in the school of Bramah, and afterwards worked for Maudslay and Field. This clever machinist invented the planing machine, without which no perfect plane can be made. The value of such a machine is incalculable. Indeed, upon the truth of the plane depends the whole value of modern machinery. Of old, by chipping and filing, an attempt to approach the plane was made, but of course perfect accuracy was out of the question.

The fame of Clements acquired by his planing machine directed the attention of Professor Babbage to him when constructing his famous calculating machine. This instrument was, perhaps, the most wonderful specimen of a mental labour-saving machine that was ever conceived. Professor Babbage, indeed, only commenced its construction, and before he had proceeded with the working drawings far, we are told his ideas with respect to its capacity as a calculating machine developed so rapidly, that the Government became frightened. Certain portions of this curious engine were, however, furnished by Clements, and remain now, we believe, in the South Kensington Museum as splendid fragments of mental and mechanical labour. But although the English had not the honour of carrying out the idea conceived by one of her sons, yet it did not fall to the ground. The Messrs. Scheutz of Stockholm followed it out, and after many years' labour produced a calculating machine, a copy of which was purchased, some years since, by the

British Government, and was subsequently employed in calculating a large volume of life tables, which we are assured by the authorities at Somerset House never would have been undertaken had this machine not been in existence. Everything Clements undertook he did effectually. To this day we all of us have experience of this in the steam-whistle which was invented by him.

Perhaps a still greater pupil of Maudslay was Nasmyth. This remarkable man was the son of the celebrated artist of that name, consequently he sprang of a cultivated stock. Nevertheles he commenced work in his master's celebrated shop at ten shillings a week, and worked his way up from the bottom to the top of the ladder in his own walk of art. This ingenious man may be said to have been called forth by Brunel's gigantic design for the Great Eastern steamship. It was originally proposed to propel this vessel by the paddle, but the shaft for this purpose would have been so large that no forging tools then in existence would have been able to turn it out. Brunel accordingly appealed for help to Nasmyth, who responded by sending a drawing by return of post of his famous steam-hammer. It was, nevertheless, determined to substitute the screw for the paddle, and the drawing was forgotten. Some years afterwards, however, Nasmyth was visiting a celebrated iron foundry in France, and noticing a piece of forged work that he knew could not have been accomplished by the ordinary means, he was curious enough to inquire how it had been produced. The answer was, "Why, with your steam-hammer to be sure." The Frenchman had been shown the drawing, and, rightly estimating its value, he had one made. Large designs call forth large tools, and large tools, in their turn, call forth large designs. Had it not been for Nasmyth's hammer there would have been no such things as ironclads, neither would there have been any of the monster cannon built up on the coil system, as they are at present. The steam-hammer enables us to undertake Cyclopean tasks, which we should never have dreamed of otherwise.

The last and best known machinist of the goodly band that issued from the establishment of Messrs. Maudslay and Field is Joseph Whitworth. This celebrated iron-worker improved upon Clements' planing machine in his Jim Crow planer. This machine works with a cutter, which reverses itself, cutting backwards and forwards without losing any time. It was at work, it will be remembered, in the Industrial Exhibition of 1862. Whitworth is, perhaps, best known by his rifle-gun, the rifling of which is the very perfection of art. Accuracy of work, learned by him from the traditions of the shop in which he was taught, led Whitworth to contrive various machines for the furtherance of that object. He has invented one machine which detects variations of a millionth of an inch. It is very likely that this contrivance will be but rarely used, but the influence of the practice of its inventor must have immense effect upon the trade, and help to keep up a standard of excellence which less-known men, if they would succeed, will have to attain. The use of machinery has now become so general that the perfection of workmanship is almost a necessity. Such contrivances as those we have drawn attention to would have been beyond the reach of the simple hammer and file of our forefathers; and if the world were reduced once more to the hand of the craftsman for the production of its machinery, all its great operations would gradually be brought to a standstill. Yet it is but little more than half a century since the hand was all we had to depend upon in the world of mechanics. If the reader wishes to measure the difference between the old work and the machine-work of the present day, he has only to look down the hold of any penny steamer at one of Penn's marine engines, or to behold the splendid specimen on board the Warrior ironclad. This engine was designed, also, by the Messrs. Penn, and the perfection of its workmanship may be estimated by the fact that when its five thousand pieces were assembled together for the first time, such was the mathematical accuracy of their fit, that as soon as steam was got up it began to move with the utmost smoothness. Let the reader, we say, compare this splendid piece of work with the old Newcomen engine in the South Kensington Museum, and he will at once see the ages of mechanical genius we have traversed since Watt took the latter in hand, and by patient thought built up out of it the present steam-engine. Yet it is not more than a century ago that that machine represented the most powerful motive engine we possessed, and was as fair a specimen of work as the eighteenth century could turn out. Such are the differences that have been brought about by half a dozen able men carrying out the traditions handed down by Henry Maudslay—mere workshop traditions, which now are acted upon throughout Europe wherever the machinist's skill is known.

EVERYBODY'S FRIENDS.

How difficult it is to imagine a world without an annual new birth—a renewal of light and life! It may be said that in the tropics there is but little change all the year round, but that is not exactly so; the difference may not be as great as in the temperate regions, but the tender green of the rice fields notes the vernal season as unmistakably as the springing of the grass in April time at home.

But let us suppose a climate in which there was that desiderated thing in the thoughts of the thoughtless, if we may be allowed the term—a perpetual summer. What a horrible sameness, and what a consequent longing for change would come upon us, even if it were for the worse! The winter snow is the winding-sheet of the old year, from which the new year, with all the vigour of renewed youth, rises afresh. It is difficult to realise the irresistible impulse given to mother earth, unless we watch from day to day the impetuousness with which she throws from her bosom the hidden life that for so many months has lain dormant there. Take a turn in the kitchen garden—note the force with which the deep crimson shoot of rhubarb thrusts the clod aside, as it pushes through the soil like a powerful human fist. Note the hop plant rushing through the ground, each shoot striving to be first in the universal race; or the vigorous chestnut bud bursting all at once with sap, and longing to unfold its umbrella-like leaves of tender green to shelter the young lambs that nestle beneath its shade. These are the more prominent heralds of the glad season; but, unobserved except to loving eyes, the minutest texture and embroidery of our universal mother is silently renewing itself. How the delicate moss is taking upon itself a more tender green; and how the plenteous robe of the hill-side and meadow, putting on a gladsome and refreshing smile, beckons us, as it were, to "fresh fields and pastures new!" Mary Howitt has noticed the silent encroachments of nature's carpet gradually spread, not only for the merry footing of the lads and lasses on the green, but wherever the wearied human eye can receive nature's silent consolation.

"Here I come creeping, creeping everywhere,
By the dusty roadside,
On the sunny hillside,
Close by the noisy brook,
In every shady nook,
I come creeping, creeping everywhere."

What an infinity of daisies spangle the meadows and gaze up at heaven, seemingly full of wonder and gladness at the new world their eyes have opened upon! What a glow of gold there is upon the meadows from the sheen of the buttercups and the dandelions! It is the fashion to root up these simple white and yellow flowers from our lawns, as base intruders: croquet will not tolerate their presence; but those who look upon nature with a larger eye than the fashionable lounger, who wishes to treat the sod as a bare carpet, regret that it should be necessary to obliterate the glorious pattern and the harmonious colouring nature has so deftly woven for our delight. I never see the gardener with his spade, rooting out the dandelion as though it were some noisome thing, without thinking of the different eye with which the poet looks upon this common flower.

> "Gold such as thine ne'er drew the Spanish prow
> Through the primeval hush of Indian seas,"

is among the grand lines the American poet Lowell sung of this contemned weed. We back the singer against the gardener, and think the reader will agree with us.

As we wander through the woodlands, noting the restless leaves that dance ever and anon, as the sudden gusts of wind search round the tree-stems, we see, here and there, the primrose lifting its delicate flower through the dead leaves—life appearing through decay! What a lesson it reads us of the incessant efforts of nature to reinvigorate and restore! These nurslings of the early spring, asking no man's aid, thrusting their beauties upon us in spite of the efforts often made to destroy them, seem to come with a sweeter grace, and to surprise us with a more genuine delight, than the carefully tended flowers art calls forth before their time. We would rather gather a nosegay from the woods than buy it wired and arranged by the best florist in Covent Garden. To take a turn in the Floral Arcade towards the end of February, is sufficient to derange one's ideas as regards the calendar. Time is pushed forward a couple of months—the old man with the scythe is hurried on until he is out of breath. But this forced pace tells. The blooming hyacinth and the fragrant tulip perish after blooming for one night beneath the feverish gaslight, and we go back to the woods and the hedgerows, and find the primrose persisting in its modest beauty, as we looked upon it a week ago.

There is something in these hardy nurslings, but too often

> "born to blush unseen,
> And waste their sweetness on the desert air,"

that brings us back to the calm of nature, which will not be forced out of her own time and season. Yet, for the day, the Flower Market in Covent Garden is a sight not to be neglected. Turning out of a cutting east wind, the vistas of flowers in full bloom, like the fair creatures seen hovering about them, come upon the lounger with a sudden surprise. Nature, he finds, with the aid of wealth, gives him glimpses of a scene worthy of the Arabian Nights. Whether it is the flowers or the fair faces that entrance him we will not say, but that the change from the bleak street to the blooming alley of flowers is quite theatrical in its bright contrast, is most certain.

But independently of these hot-house flowers, forced for drawing-rooms, towards the latter end of April the true spring flowers, cultivated in the open field, make their appearance. The love of flowers in all great cities is irrepressible. The more we divorce ourselves from nature, the stronger is our love of her. Note the little window-gardens in Spitalfields, where the weavers are hived in a dismal labyrinth of brick and mortar, how bright they look, amply repaying the care taken of them in a repulsive atmosphere. Note the fresh sod for the caged birds. The human caged bird has a still stronger thirst for the first flowers of spring; even among the very poor this passion is strongly pronounced, and the market gardeners in the immediate neighbourhood of the metropolis take pains to supply the civic want. As we pass by train through the highly cultivated ground in the suburbs between the avenues of fruit-trees white with early blossom, we see bright lines of colour running between them. As the train rushes along, all the colours of the rainbow are alternately displayed to us. These are the blooms of the spring flowers, grown wholesale for the populace. Wall-flowers seem to be in universal demand, for their perfume, and they come to Covent Garden by the waggon-load. In the neighbourhood of Chiswick, where spring flowers are especially grown, their gathering employs large numbers of women. Daffodils run like rays of golden sunbeams, and the delicate lilies of the valley, trembling with the slightest wind, light up the brown earth with their tender green and white. If we may be permitted to speak of a moral salad, as a purifier of the brain after the dull influences of a city life, a ride in April or May, through these fields of asphodel may be considered a psychological medicine of the highest value. It is one we feel instinctively, and rush to take advantage of it, just as a dog touched in the spring with mange rushes into the fields, and unerringly bites the couch-grass, as a material remedy.

But it is not every one that can afford time to go to the woods and fields to see the flowers, and to these the flowers must come. The city clerk or the workman can carry a posy in his button-hole, and thus shake hands, as it were, with the floral goddess; and to minister to their desires, of late years, the "gutter children" find employment. Early in the morning, groups of young girls may be seen in the spring season about the railings of St. Paul's, Covent Garden, making up little nosegays, which some of them arrange tastefully as regards colour. They have even imitated the practice of the more aristocratic bouquet makers, and have learned to wire the flowers together. Even before the regular out-of-door flower season begins, they wire together the myrtle and little noisette roses, and as they appeal to the passer-by, "Only a penny, gentleman," few can resist. These poor children in their dirty rags present a pitiful contrast to the brilliant offerings of nature. The legislature has taken measures to cultivate their minds, but their bodies are left to take care of themselves. In foreign countries the flower-girls are generally brightly and cleanly dressed in some kind of costume. The Roman flower-girls look as bright as the blooms they sell; and the little Swiss maidens, who bring the tourist the Alpine flowers, are costumed as if for a fancy ball. With us it is just the reverse, and the purchaser, as he puts the blossom in his button-hole, does it with a feeling of pity for the poor half-starving little ones who administer to his vanity. In the City, especially near the Stock Exchange and Bank, where money is plentiful and where it is dispensed liberally, the flower-girls are of a higher class. Pinks and carnations set in a leaf are the fashion among the Corinthian youth, and sixpence is the tariff. A remarkably handsome girl, a year or two ago, used to dispense the favours of Flora to the members of the Stock Exchange, and flowers in her hand ran up to a remarkable figure. It is pleasant even in these realms of Pluto, to see the love of Nature asserting her claims. The grimiest old fogy and the jaunty dandy bow down before her, and by her influence at the vernal season they feel for a moment their youth renewed; for, as Tennyson has so sweetly sung,

"In the spring a livelier iris changes on the burnished dove,
In the spring a young man's fancy lightly turns to thoughts of love."

GOOD FOOD FOR THE MILLION.

WHEN a leg of mutton is elevenpence a pound, it is time for the father of a family to pay attention to any means by which he may lessen the amount of his butcher's bill. The necessity of the case at once sets aside all sentimental considerations in favour of the roast beef of Old England. If we can get it half the price from the other side of the globe, to the other side of the globe every sensible man will go, as men are going and will go in increasing numbers year by year.

When M. Appert, in France, in the year 1811, discovered the process of preserving meat *in vacuo,* he was not aware of the incalculable mercy his process was destined to confer upon the world. At a stroke he rendered it easy to make the redundancy of one part of the earth subserve to the scarcity of other parts. It seems only yesterday that we heard marvellous tales of the enormous flocks of sheep and heads of oxen which seemed almost squandered on the Australian plains. We were told that they were boiled down for their fat, and the poor man who scarcely once a week tasted animal food in this country heard the tale, and marvelled that Providence should allow such starvation to be mocked, as it were, by such plenty only a three months' voyage away. But, as it generally proves in such cases, we blame Providence when we should have blamed man. Years ago, as far back as 1839, the very process now so successfully employed was at work supplying our navy yards with preserved meat for our sailors. It unfortunately happened, however, that the agent who supplied the Navy Board with these meats from Moldavia was not careful enough in sealing his cases; a few putrid tins happened to disgust those in authority, and "Goldner's Canisters"—for at that time the process was known to the public through his name—was synonymous with everything that was disgusting; and prejudice for the moment banished preserved meats from our ships; scurvy resumed its sway, and the process might have died out, were it not for the high price of meat forcing the civil population to demand an appeal once more to the flocks and herds of our antipodes. The unbiassed public, this time, were the judges of the value of this new commissariat, and year by year they have been loudly pronouncing in its favour. Indeed, we may now say that the roast beef of Old England is happily supplemented by that of Australia, at less than half the price.

But as the reader, possibly, is not aware of the method of preserving the vast animal resources of the New World, to which the public have only just opened their eyes, we will briefly describe it. As a preliminary observation, we may say that it is yet a disputed question, whether decomposition of animal tissue is arrested by the mere act of preserving *in vacuo*, or whether the application of heat destroys the germ of life within it; but the question is of no importance, inasmuch as by the process employed the atmosphere is excluded by the application of a high temperature. The process may be described as follows:—The round tin in which the meat (previously deprived of bone) is rolled and placed, is covered with a top, and hermetically sealed, with the exception of a pin-hole, through which the steam is allowed to escape. The tin is then placed together with others in a bath of chloride of calcium, a dark-looking mixture which does not boil under a temperature of 320 degrees.

By means of steam pipes this mixture is heated to the required point, and the contents of the tins slowly cooked; as this process is going on, the steam is seen to issue out of the pin-hole, driving before it all the enclosed air. When the cook thinks the meat is sufficiently done, he squeezes from a sponge a drop of water into the pin-hole; the steam is condensed, and at the same moment he drops a plug of solder in the hole, which hermetically seals it, and the process is finished. But the fact that all the air is excluded has to be proved by another test.

The tins are placed one above another like so many bricks, in what is termed the testing room. Here they remain for several days, when the fact of the air being exhausted from them is ascertained. When perfectly sound, the pressure of the outside air forces the head of the tin inwards so as to make it assume a concave form. As long as this concavity exists, the meat within may be assumed to be sound. A fact, this, every purchaser should not fail to observe. We need not explain the method by which the tin is opened, but we may as well here notice, a popular error confounds this method of preserving with the ice process. We know that when decomposition has been arrested by the mere act of congelation, on the application of heat such meat is liable to decompose very rapidly. But such is not the case with meat that has been preserved by the exhaustive method. The contents of the tin need not be used all at once for fear of its turning bad, inasmuch as it has not a greater tendency to putrefaction than any ordinary cooked joint.

The great amount of heat to which the tins are subjected is the cause, we imagine, that some of the meat is over-cooked, causing it to put on a stringy appearance, its solidity apparently being entirely broken down. To this irregularity in the cooking, we can only refer the failures some of the correspondents of the papers affirm they have experienced in obtaining good meat properly cooked. The beef and mutton eat as well as the primest English beef or mutton. The public may depend upon either the Ramornie Brand, the "Melbourne Cooked Meat," or that of which Mr. Tallerman, of Cannon Street, and Messrs. McCall, of Houndsditch, are the agents.

It is also as well to know that, as the meat is already well cooked, when a stew is required it is only necessary to warm it, the vegetables with which it is to be mixed being prepared apart, and placed with it afterwards. We perceive that many recipes have been given for the preparation of a hash or stew, in which this has not been pointed out, and without doubt the meat in consequence has been overdone.

We can with the greatest confidence endorse Canon Kingsley's high opinion of the preserved meat, which, when properly cooked, makes a most nutritious and wholesome meal. The advantage of cooking it in closed tins, is that all the good qualities of the meat, which are partially lost in cooking at the open fire, are hereby preserved, and are available for any preparation to which it may be applied. The enormous increase that has taken place in the importation of this supplementary food for the people, may be measured by the fact that whilst in 1866 we imported preserved provisions from Australia to the value of £321 only, in 1870 it had reached to £203,874, and we may safely say that this year it will have exceeded £700,000. As a rule we must admit that the meat eats best cold. The warming-up does not altogether improve it. But the method of rolling takes away from the meat the form in which we are accustomed to see it, hence, no doubt, the silly prejudice fostered by the butchers against it. There is no reason why a leg of mutton or a sirloin of beef should not come to us in these tins, in the same way that tongues and kidneys arrive. The only difficulty is in the irregular shape of the tin thereby necessitated; but this is a difficulty that could easily be overcome.

The Royal table was furnished with these cooked joints during Prince Alfred's journey round the world, and the Prince testifies to the excellence of their quality. What is good enough for Queen Victoria's son, ought to be good enough for ill-mannered servants, for these latter are the chief persons who turn up their noses against this providential supply to our starving millions at home.

But, although the Australian superfluity of animal food is by far the most important feature of the new method of indefinitely preserving articles liable to decay, yet it is applicable to all perishable articles. Whenever there is a glut of any vegetable production, the great preserving houses of London immediately bottle them up for future use in this manner. Green peas may now be had as good as fresh all the year round. We have not seen cucumbers so fortified against destruction, but we see no reason why they should not be. Turtles' fins, kangaroos' tails, and other dainties from far-off lands, are now to be had of any grocer. In fact, the surplus stores of the whole world are being brought to our doors. Nevertheless, it seems that it is now necessary to educate the people to eat these bounties of Providence science has secured for our hungry multitudes. The poorer the people, the greater hesitation they seem to have to make use of it. The very fact that it is confined in a tin seems to set them against it. "I like to see what I eat," is the common objection even to trying it. Even a saving of fifty per cent. is not inducement enough. Letters of assurance, therefore, from such authorities as Canon Kingsley are of the highest value to disabuse people of their ignorance, or to persuade them that they are not investing in "boiled babies," or offal, which our Australian fellow-subjects across the ocean are supposed to throw to us.

The meat supplies of South America are illimitable. We see that a new experiment which promises to give excellent results is now in progress; a process by which whole carcasses are frozen in air-tight cases by means of ice packed over them, which freezes the mass sufficiently to keep the meat sweet until it reaches this country. The first experiment in this means of transport failed, but through causes which can, and will we believe, be avoided in the next venture.

REFUSE AND WASTE.

AMONG the most interesting examples of the use of refuse may be mentioned the celebrated super-phosphate manure termed coprolites. These were discovered quite accidentally, in the year 1846, by an artificial manure manufacturer, whilst walking on Bawdsey beach. Happening to pick up some coprolites—which, it may be stated, are the fossilised guano of an extinct saurian—he discovered that they were full of fine manuring qualities. He set children to pick them up. Whilst thus employed under the cliff, where they had been excavating to gather them, the crag fell upon and buried a little girl. The notoriety thus given to the employment led the farmers to search their crag pits, where they found this fine manure in large quantities, and as it was worth £3 10*s.* a ton, the farmers grew wild in search of it. The farms in this part of the country presented the appearance of gold diggings; wheat crops were dug up, valuable buildings undermined, and even churchyards searched for the precious deposit. It is said that fully half a million's worth of this antique manure was in a few years secured. But the sources of manure for the fertilisation of our fields are plentiful enough, without going back to the fossilised guano of long-extinct animals. The liquid manure that now flows through our new system of sewers is one of the finest fertilisers known. In Edinburgh a far less rich manure is utilised to flood the Craigentenny meadows, which produce three splendid crops of grass in consequence during the year. Whilst we are neglecting this river of liquid manure, which is ever running to the pollution of the stream, we set boys to collect with infinite trouble the horse-droppings in the streets of the city. Such careful savings do indeed seem strange beside such lavish waste.

Turning to the more miscellaneous items which afford instances of the use of waste, we may mention vulcanised India-rubber. At one time it was thought the process of vulcanisation—in other words, treating the rubber with sulphur—prevented the possibility of its being used again. It has been discovered, however, that it can be reduced to a plastic state and re-manufactured. About seventy per cent. of the waste material is mixed with thirty per cent. of raw gum, and the resultant rubber is as good as that made wholly of fresh gum. This discovery tended to cheapen this material very much, as at the time it was made the refuse material was selling for £18 a ton, whilst the pure gum sold at prices varying from £150 to £200 a ton.

The sawdust of various woods is now turned to good purposes—that of boxwood is used for cleaning jewellery, whilst mahogany sawdust is employed for smoking fish. Birch and rosewood sawdust is used by furriers in cleansing furs. In Paris common sawdust is very ingeniously utilised. A method has been discovered of forcing this material into solid moulds by the aid of heat and the hydraulic press. The sawdust thus pressed is said to present a brilliant surface, which possesses great durability.

Turning our attention from the vegetable to the animal kingdom, we may add that a beautiful and nutritious jelly is made from ivory-dust, which is very strengthening to invalids. This is the only portion of the elephant that is eaten in England; but the flesh of this animal is consumed by the natives of Africa, and Gordon Cumming says that elephants' feet are a very great delicacy.

In the search that has been made for a new paper-making material there has been some success. Good paper is now made from esparto, a wild grass growing in Spain and the Barbary coast in large quantities. It certainly makes very good paper, and might take the pressure off rags, which are still rather scarce and dear. It was imagined that when the trade was opened with China the teeming population of that great empire, dressing as it does in cotton goods to a large extent, would be able to yield us a plentiful supply of old rags. Those who counted upon this source of supply knew but little of the economical habits of the Chinese. Rags were not likely to be wasted in that country. On inquiry, it turned out that the material in question was used up—for what purpose does our reader think?—for making the thick soles for boots! As may be imagined, all waste paper is sorted; the clean, such as the shavings and clippings from bookbinders and envelope makers, is worked up afresh as white paper. The fluff of cotton that is given off during the course of manufacture is, however, available for paper-making, and for the manufacture of coarse sheets and bed-covers. The American cotton waste is used, we are told, in making furniture and fancy articles—a product like our papier mâché. A paper could be written on the uses of waste fibres alone. Great quantities of the waste of hemp and flax are made into bags, sheeting, and yarn. The outer husk of the cocoa-nut (not the shell) makes capital cordage, very light and strong; in these particulars, indeed, it has the advantage over hemp.

LOVE MANUFACTURED.

When we come to consider it, how can we account for the fact that a certain day in the year is set apart by immemorial custom for the whole youthful population to exchange love greetings—to send showers of darts, through the medium of the postman's bag, in every direction? It would seem as though the youthful god, not content with the isolated engagements which he instigates from day to day, finds the amatory infection so irresistible, that he feels necessitated to give a grand field-day once a year to let off the superabundant pressure—to soothe the feelings of those loving hearts which, having no recognised object, still desire to draw a bow at a venture, with the hope that he may hit some mark. Be that as it may, the valentine is an institution which we believe will never die out. The education movement, destined to sweep away many other illusions and delusions of youth and age, we prophesy will only make the arrows of the little god fly all the faster, and in larger flights, inasmuch as there will be all the more to read and write them; and we will back the sentimental infection, which rules without law or compulsion of any kind, to outlive all the laws of the Medes and the Persians themselves.

But if valentines are immortal, they are not immutable. We are not so very old as to have forgotten the neat little superscription that once fluttered and warmed us, as with trembling hand, one 14th of February, 18—, we broke the seal and disclosed a pure love effusion, in a sweet Italian hand we fondly guessed at. Then a valentine was a valentine—a little bit of pure romance, all to your very self. You could imagine the lover radiant with hope inditing it, and *you* were worth the trouble of the rhymes, poor enough possibly, but hammered and fitted together with a most distressing amount of brain work. Was not this sufficient to enlarge your bump of self-esteem, and make even a wintry, foggy morning look like a summer's day?

But the supply of sentiment in those days was an article of home manufacture; now all is changed. It is no longer looked upon as a waste article, but one that may be turned to a manufacturing purpose—*vide* the stationers' windows on the eve of St. Valentine's day.

Curious to see one of the veritable temples of Venus, whence issue the bleeding hearts and flowery darts of Cupid, we were directed to a very unromantic house in that very prosaic thoroughfare, Aldersgate Street, in which is installed as agent of the classic goddess a very business-like un-romantic-looking Englishman, who does by substitute, we are given to understand, the major portion of lovers' work in this country. We were informed that he keeps a real poet, as part of his manufacturing machinery; and as we wound our way up the dark and devious stairs, we looked about for that individual with "eye in fine frenzy rolling," but failed to catch it, as we passed the smudgy-looking printers intent upon their prosaic work. Nevertheless, this armoury of Venus upon inspection proved to be one of the curiosities of this great city. We soon became aware of one fact that a little astonished us—the valentine of the shops is not even indigenous. Not only do we no longer address our lovers in our own phrases, ornamented with our own devices, but we fail to supply the manufactured substitute. France, the reader will instantly suggest, finds us in the sentimental finery, the amatory poetry, and the soft lace work in which the British youth wraps up his affections. Nothing of the kind: strange delusion: they know nothing of valentines in fair France. There, New Year's Day takes its place, and it is to old Germany that we have to go to find St. Valentine as much respected as amongst ourselves. In the old land of printing the valentine has always been a theme for the printer's and the lithographer's art; hence the reason of their power to supersede our own handicraft in this department of ornamental stationery. But if we import the foreign work, we utilise it in our own fashion. German valentines come over to us in the form of embossed and coloured card-work, of the most elaborate character—wreaths, devices, pictures, emblems, all grouped together in fancy designs; the different parts, however, being attached by fine points which easily break asunder. The English valentine-maker fancies he can make combinations of his own out of these easily resolved materials, which will suit the home market better; hence the first part of his business is to break the German valentines to pieces, in order that they may be built up afresh. Rows of sprightly young damsels are engaged at this work, tearing hearts out of encircling wreaths, separating lace-work from mottoes, with the most unconcerned hands, disuniting the most touching emblems, reducing flowery pictures to mere *disjecta membra*, which other hands are employed in reuniting in a more simple fashion. All valentines, it is true, are not subjected to this revolutionary process; it is only the cheaper sort, in which we cannot compete with the foreign work. The more expensive valentines are of home manufacture. The range of cost is extraordinary, extending from a penny to a pound. In the higher-priced ones, satin and lace are the surroundings, and the settings are exquisite pictures. These are arranged with such springs and delicate foldings that they will not bear the rough usage of the post, but require the protection of elaborate cases. In short, a high-class valentine packed for delivery is like a lady going to the opera, who must have the whole carriage seat to herself, to keep her flounces, her Brussels lace, and her towering head-dress entirely free from the touch of ordinary mortals; so the delicate fancy valentine is fenced off, and goes by the parcel post—a mighty aristocrat beside the ordinary penny specimens in the postman's bag.

Lace-work for valentines is a manufacture by itself, and is made in a very curious way. It is stamped in relief in a metal mould; one side of the mould is then lifted, and all the superfluous paper is rubbed away with pumice-stone, leaving the lace pattern in the die, from which it is lifted when cleared of its surroundings.

The German custom of sending presents and good wishes at Christmas and New Year's Day is becoming prevalent in this country, as we may see by the shop windows, which flame up with a brilliancy peculiar to the season; but creature comforts are antipathic to sentiment, and in no way interfere with the desperate outgush of tender emotion peculiar to the saint's day. Cupid may despatch any number of doves, but imagine a fond youth sending a veritable goose to his valentine! The gift-literature of the occasion is vastly different. "The compliments of the season," encircled in a wreath of holly-berries, &c.—what fuel would such cold comfort bring to the burning hearts of lovers!

We suggested the possibility of the one gift superseding the other to the eminent producer of valentines before mentioned, but in an irresistible manner he waived it aside by the remark, "It is quite a different trade," evidently pitying the derangement of our ideas. It is a notable fact, however, that among the upper classes gifts of the season entirely take the place of the valentine. If they ever circulated among the upper ten thousand, they have long ceased to do so.

Old customs die out faster among them than with the people, for the reason, we suppose, that they are more cosmopolitan, and their affections are more masked. The very grain of the nation is not smoothed down to one dead level among the middle and lower classes, as it is with the upper. A certain advertising perfumer has made a bold attempt to move the aristocratic world on the saint's day by the invention of scented fans—gifts suggestive, we suppose, of the blushing occasion; and by a tender nomenclature for his perfumes, which must move even Venus herself; "Kiss me Quick," and "Love Lies Bleeding," are odours that live in the air for many a distant day, and may remind a lady of her valentine long dead and gone.

But to leave these delicate insinuations, and to return to the real old valentine. If Love is blind, it accounts, we suppose, for the delightful stupidity with which he rhymes on this occasion. Amateurs find it difficult enough to make the fire of passion fit in appropriately for the day; they may therefore make excuse for the poor mortal who does the work by deputy for those not able to be their own Apollo. "Pray does your poet wholly devote himself to valentine writing?" we asked the maker. "Oh, no; he keeps the accounts," was the prompt reply. Imagine the contention in the poor man's mind as the 14th of February approaches! the dire struggle between figures and fancy! We wonder if, in moments of abstraction, he ever calculates in rhyme! It is very probable, inasmuch as his rhymes are highly figurative.

But what is to be done for those poor valentines who can neither read nor write? Cupid is equal to the occasion: they can at least see; and, to our mind, by far the most poetical valentine in idea is the one that comes *in propriâ personâ* on Saint Valentine's morning. Imagine the flutter of the young maiden when she first looks out of window or opens the door! Mystery adds charm to the occasion. There is always some young prince in every girl's mind that is coming to seek her, as in the fairy story; but as a matter of fact, alas! these princes are ordinarily disguised in the form of the sweep, the milkman, or the dustman, or more commonly still in the commonplace form of the postman, "bending," as Charles Lamb says, "under tender embarrassments not his own." Doubtless it is well to imagine, in this work-a-day world; and as long as it exists, young maids will go on imagining.

But the postman's knock on this special occasion, what a different thing it is to that he gives when delivering small tradesmen's bills. There is something hilarious in it; the bell rings with a joyous vibration, re-echoing the floating sensibilities in the air, and what a joy-note it awakens in the house! Have you ever casually watched the windows of a young ladies' school on the eventful morning—every pane alight with expectant eyes? Do young ladies in those establishments write valentines to each other? We suspect these little stratagems, and we feel pretty certain the solemn teachers of an uncertain age console themselves with these boomerang epistles, which they flatteringly think put them on a level with their tittering pupils. "Drat them there schools!" said an old battered Mercury to us one Saint's day morning. "I'd valentine 'em, if I had my will." And truly one can anticipate the bother these gouty-knuckled old go-betweens will experience when they come to shuffle some frosty February morning, the packs of halfpenny cards which promise to overwhelm them. Open valentines! Think of this, fond lovers—the secrets of your hearts open to the prying eyes of the village post-mistress, to say nothing of the postman, unless they are cunningly hidden in invisible ink, which warms into life in your valentine's bosom. But, really, publicity is a serious infringement on the time-honoured secresy of the day, which the Postmaster-General has to answer for. The more modest and gentle effusions will fold themselves from observation after the old manner; but spite, and rancour, and malice will take advantage, we fear, of the new arrangement to proclaim themselves upon the housetop. We can imagine how Snip will be turned into ridicule, and the sour-faced visages that ancient virgins will have to encounter on the backs of the halfpenny post-cards they fondly trust contain some good news. Perhaps, though, the valentine-makers will set their faces against this new means of turning a day of innocent pleasure into one of lampooning and vulgar caricature.

Let us hope that the educational movement will not only tend to quench the feeling for these offensive missiles, but that it will elevate the popular taste with respect to them. As a rule, the national sentiment as expressed in the cheap valentines is neither refined nor elevating. In them the dearth of fancy, poverty of invention, and the barbarities of art have, we think, reached their climax. Is not the occasion worthy of being elevated by some of our sweeter singers? If war fires the imagination, and produces such stirring songs, why may not the tender sentiment also have its turn?

The statistics of valentines, if they could be procured, would be very curious. There is no means of even making a guess at the numbers which pass through the post-offices of the entire kingdom; but a guess may be made at the numbers passing through St. Martin's-le-Grand. The average number of letters is pretty well known, and in the year 1866 there passed through the London post-offices, for delivery in town and country, 897,900 in excess of this average on Saint Valentine's Day. In 1868 the excess had increased to 3,199,142. Probably on St. Valentine's Day, 1874, this number will have increased to five millions and a half, bringing a revenue equal to that of many a kingdom. Who shall say after this that sentiment does not pay?

A BOX OF MATCHES.

Phosphorus, like many other valuable substances, was discovered accidentally by a German who professed alchemy, and in the search after the unattainable, hit upon a very valuable substance that had been hidden away in the secret recesses of nature. Nothing that is pursued earnestly in this world fails to give forth fruit; it may not be the fruit we desire, but in most cases it is far more valuable than that we look for. At first the means of producing phosphorus were very expensive; "the marvellous lumen," as it was termed, sold in 1680 for three pounds sterling the ounce. Even as late as 1718, it could not be sold for less than fifty shillings an ounce. Possibly its rarity was the reason that, in the seventeenth and eighteenth centuries, it never struck any one to apply it to the purposes of match-making, although its quality of producing fire was known almost from the date of its discovery. In 1769 Galen found out that it was plentifully obtainable from bones, and the process of obtaining it was pretty much the same as at the present time. Comparatively speaking, it fell greatly in price, but still its light-producing power was not evoked. It is difficult to account for the reason why almost self-evident uses, fail to strike the minds of generations of men; but that they do, we have the evidence of many great discoveries which have remained barren for long periods, and only by accident have been turned to good account. The old flint-and-steel implement of producing fire—really more barbarous because not so simple as the savage's friction between two pieces of wood—served us during all the years that phosphorus was plentifully at command; and even up to the date of the passing of the Reform Bill, the light of other days was practically derived from the tinder-box. Science had not been entirely idle all this time, however. As early as 1804, a new light was brought before the public for a short time. It was a mixture of phosphorus, oil, and wax. Into this composition a sulphur match was dipped; and, by rubbing the match upon the cork of the bottle, it was made to ignite. For many years a series of compositions, in bottles, were used for the like purpose; but as they were sold at a shilling a case, of course they were without the means of the great mass of the population, and served as the playthings of the scientific and wealthy. Every year, however, chemists and scheming men were approaching the desired end: as schoolboys say, they "burned," but turned off again.

In 1826 the lucifer was invented. This was a sulphur match, tipped with a composition of chlorate of potash and sulphuret of antimony. It was ignited by means of a piece of card doubled and lined with sandpaper. It required a very sharp pull to make the match ignite, quite as much as to pull a bonbon, and the great friction speedily wore the sandpaper away and rendered the matches useless. Most of us can remember this apparatus, and how the old woman with her tinder-box used to laugh at the new-fangled notion. The Promethean succeeded. This match ignited by being dipped into a bottle, and was too dear to come into general use. Thus it will be seen that the lucifer struggled hard to come into existence, but many times it failed. It was not until the year 1833 that it became a practical working fact. One writer indeed tells us that the lucifer was invented by Mr. John Walker, of Stockton-upon-Tees, in 1827; but we are not aware how he learns the fact, and certainly the trade knew nothing of any really successful match before the year 1833. When anything has proved to be a great success, there are plenty of unheard-of-before claimants for the discovery. How many men have been accredited with discovering the use of steam, before Watt set it to turn our machinery and pump out our mines! So it is with the lucifer. Many persons no doubt prepared the way, one adding a fact here, another a fact there, a third showing what was not possible, and a fourth what was possible. By many steps perfection in both cases was gained at last, and necessity may be said to have been the inventor of all our great discoveries. Be that as it may, by the year 1833, with a new light burning in the political we had a new light in the material world, which has gone on burning brighter and at a cheaper rate ever since. In the early infancy of the lucifer, the match was made entirely by hand by little masters, who often did the whole work themselves. By degrees, however, as the demand became universal, and the tinder-box became a thing of the past, it grew into a large article of manufacture, employing much machinery and a large number of hands, with the aid of steam. Phosphorus that sold wholesale at four guineas a pound in 1833 fell by degrees, until quite lately it has been only 1*s.* 9*d.* a pound. The boxes of wooden matches have, by curious devices, been so swiftly produced, that the phosphorus boxes of matches that cost one shilling each in 1830, and then failed but too often to yield a light, are now produced at a cost to the wholesale dealers of eighteenpence a gross, each box containing a hundred matches.

The making of the splint is the first step. The reader, no doubt, has wondered how these are made all exactly of one size. Of old, they were split by hand; but now they have to be made by machinery, and an odd contrivance is resorted to. We may say at the outset, however, that the wood must be perfectly dried to burn, consequently the blocks out of which they are made are at first desiccated by being stoved at a temperature of 400° Fahr. Nothing but the best quality of pine wood, as free as possible from knots, is employed. Planks of this kind are cut into blocks eleven inches long by about four and a half inches wide. These pieces of wood, when thoroughly dried, are taken to the cutting machine. This is an apparatus having an iron bed, through which project thirty lancets one-eighth of an inch apart; these lancets, as the end passes over the bed, project an eighth of an inch in depth, and score or cut the wood to that depth; this is done by one motion forwards of the block of wood. The motion backwards moves a knife which cuts the block horizontally in the direction of the fibre, an eighth of an inch in thickness; and by so doing liberates, say, thirty splints, that had previously been scored longitudinally. As fast as the machine can work, say eighty times in a minute, splints an eighth of an inch square are being detached, and fall down into a receptacle until the whole block is consumed. It is quite charming to see this machine at work, from the surprising ease and rapidity of its motion, cutting its splints by millions in a day's work. Sometimes there is a knot in the wood; in that case many of the splints are worthless for matches, and find their way into the steam boiler, where they make capital fuel. The splint, four and a half inches long, is intended as we shall see to make two matches. They are more economically made, doubtless, this way. We make the splint square, but the Germans make theirs cylindrical, such as we see in the vesuvians. They are rounded by being passed through plates of steel perforated to the size the match is intended to be. All these round matches are imported from Germany, where we are told they can be produced cheaper than in England, in consequence of the abundance of pine forests in that country. We do not see why this should not be an equal reason for our obtaining our whole supply of square splints from the same source, or else from Sweden.

The next process is to collect the splints in bundles of six dozen each. This is done by men who take the splints lying irregularly as they do, and by a clever knack, acquired by practice, placing them with a shake parallel. So nicely do these men judge the number, that they rarely have to add to the original handful they have seized. These they place in a semicircular cradle with a piece of string lying at the bottom, and at once tie them up in bundles; if they doubt whether they have enough they apply a circular spring of metal, which gauges them properly. They are now tied up, knocked flat at either end so as to ensure the splints lying in equal lengths, and are then again dried for several hours in a hot stove. As the wood, even if ignited by the chemical preparation with which they are tipped, would not burn readily, they are dipped in a preparation of sulphur; in some cases wax is used instead of sulphur, but with a similar motive. By means of a frame with holes, each individual splint is fixed by the end just like the bristles in a brush. This is done by a very ingenious machine, which it is difficult to describe, and would be still more difficult for the reader to understand. So adjusted, the splints are ready to be dipped. The igniting mixture is made of a small portion of phosphorus, chlorate of potash, ground glass to harden the compound, and crocus to colour, or any other pigment that may be approved.

This mixture is spread with a spatula on a hot plate to an even depth of about an eighth of an inch. The small amount of phosphorus in this compound is observable. If more were added, in this moist country, its power of absorbing moisture would tend to make the match hang fire. This is a merciful arrangement to the workmen, for where, as in Germany, the proportion of phosphorus is much larger, the workmen are subject to a terrible disease, which we shall refer to presently. The whole composition is fixed on the top of the splint, in the case of the common lucifer, by the addition of a little glue. The splints thus tipped are placed in a current of air to dry them, and the other end of the bundle is coated in the same manner. This process is called "frame dipping;" half a dozen workmen can dip twenty million matches in a day. A million seems a number that is beyond the mind to count comfortably; but by the rapid processes adapted in these large manufactories, twenty times that number are actually handled.

There is another method of dipping, by which only the end of the match receives any composition. This plan is performed more expeditiously. The dipping composition has a large proportion of phosphorus in it. Matches so made are preferred by some people, but they are apt to get damp. In this country, where but a small proportion of phosphorus is used, the terrible disease necrosis of the jaw is scarcely known. But in Vienna, which is the seat of many large match manufactories, the disease is very common. The action of the phosphorus is in this wise:—Wherever there is a decayed tooth, the fumes of the phosphorus find admittance, and gradually destroy the tooth, making their way to the bone of the jaw, which is attacked in the most virulent manner.

That this is the case was proved experimentally. A rabbit, whose jaw had been accidentally broken, was exposed to the fumes of this substance, when the jaw was found to have exfoliated, and in course of time it died. Thus phosphorus, which forms an important ingredient in all bone, in its extracted state is found to be its most virulent enemy. It seems to have no effect upon the enamel; hence, as a rule, all workmen in match factories are required to have sound teeth. Although, compared with foreign countries, our workmen are but little likely to suffer from the fumes of phosphorus, yet sufficient cases of disease have been noted to call the attention of the Government to the matter. Out of the small number so attacked, full half of them were dippers, mixers, and grinders—the three operations which bring the workmen in contact with the phosphoric fumes; and, we are sorry to add, one-third died. The remedies proposed by the physician appointed by the Privy Council to inquire into the question, we fear, will never prove a preventive against disease where much phosphorus is used. It is all very well to tell workmen to keep their mouths shut when at their work, but is it possible to be always thinking of the mouth, when the workman is accustomed to the danger? The only true remedy is to banish common phosphorus from the manufacture altogether.

This may be done by using red or amorphous phosphorus. This substance is made from the common variety, by subjecting it to from four to five hundred degrees of heat. The baking process transforms it into a material that possesses utterly different qualities to those possessed by common phosphorus—it is perfectly innocuous and odourless, will not melt at a lower temperature than 500°, and, consequently, is not acted upon by mere friction; and it will not ignite by mere exposure to the air, like the common variety. A very perfect match, that neither affects the health of the maker nor is liable to take fire by accident, is now made by all the manufacturers. This match requires something more than friction to light it, and herein consists its safety. The match is dipped in chlorate of potash, mixed with red lead, sulphuret of antimony, and oxide of manganese, and it must be rubbed upon a prepared surface of amorphous phosphorus, sulphuret of antimony, and glue. The contact of these two materials is requisite before a light can be produced—a grand security, this, against accident. The common match will go off by merely being trodden upon, and we believe in many cases barns full of straw have been fired accidentally in this way, by tramps taking shelter for the night. We have been informed by the assistant secretary of one of our largest fire insurance companies, that the introduction of lucifers caused the office an annual loss of ten thousand pounds; by this we may obtain some faint idea of the total loss throughout the entire country by the same cause. Among the curiosities of these fire accidents, if we may so term them, we may state, according to Mr. Braidwood's account some years since, he had noted that no less than eighty fires had been occasioned by lucifers going off from heat; forty-five in consequence of children playing with them; one by a rat gnawing a lucifer, and one by a jackdaw playing with one of these matches. Thus danger both to life and to property is proved to arise from the production and use of the ordinary match containing much common phosphorus. These are strong reasons for the more common use of the matches containing the harmless amorphous phosphorus.

There are some kinds of matches besides lucifers, adapted for special purposes. The vesuvian, for instance, is specially made for the smoker. A flame is not so much required as a red heat, which will last some little time, and not be blown out by the wind. Consequently, the tip is dipped several times in a preparation of charcoal and nitre, a little phosphorus being used at the extreme end for the purpose of igniting the bulb-like match. The vesta, again, is a wax light, having a wick running through its entire length. These matches are liable to the attacks of rats and mice, the wax being a temptation they cannot resist, and in gnawing it away they impinge upon the prepared tip and cause the match to ignite.

Lucifer match manufactories are considered to be doubly hazardous by the insurance companies, and the Legislature has prohibited the erection of any works of this kind within a certain distance of other houses. It seems questionable, however, if the match factory is dangerous to itself. To see the number of loose matches on the floor of the drying-rooms where millions are at one time drying, does not impress one with the idea that the proprietors fear any danger. To prove that a box of matches, even when lighted, can do no harm, the foreman ignited a box in the storing-room. The tips flared for a moment and then went out, the splints being too thickly packed to allow of their catching fire.

There is yet another part of the trade to be described, the making of the match-box. This, as the reader knows, consists of two parts—a drawer, so to speak, which holds the matches, and a case for the drawer to slip into. These boxes are made of thick shavings, nothing more or less. A piece of wood, of the proper size, to double up and make the required portion of the box, is placed in a planing machine, and thick shavings are, with the rapidity of lightning, taken off it. The next process is to indent it with a knife without cutting it; in this indent a woman bends the corners of the box, and the label containing the name is pasted round, and holds the structure together. The open portion of the case is made in the same way, the whole box being turned out in an extremely short space of time.

Let us take up one of these matches—a glorious product of civilisation—and let us inquire from whence the elements of which it is composed were gathered. To begin with the phosphorus, it is made from the bones of bisons and wild cattle roaming the vast prairies that border the river Plate. From this source, and from the refuse animal charcoal used in refineries, this light-producing substance is principally procured. The pine-wood of which the splints are made comes either from frozen Canada, or from Norway or Sweden; the sulphur with which the splint is coated comes from Sicily; the paper labels on the boxes are made at home. Thus it will be seen the insignificant match is a product, the materials of which have been gathered in the Old and New Worlds—in the torrid, frigid, and temperate zones. No instance could afford a better specimen than this of the wide range the manufacturer takes to supply one of our simplest wants. If each component part of the lucifer could speak, what a tale it could tell of its experiences! The splint, of the number of bears and wolves that have roamed around its parent tree; the phosphorus, of the huge beasts of which it once formed an integral part, roaming with the herds along the vast plains of South America; the sulphur, of the volcanic eruptions by which it was drawn forth from the bowels of the earth. What a triple romance lies hidden in the familiar box we buy for a trifle at every street-corner! To revert to the useful qualities of the match, let us imagine for a moment that the art of making them was lost, and we had to use the old flint and steel and tinder-box. Would it not be like going back a thousand years? It is only by measuring the distance from the past by such a simple product as this, that we are enabled to realise the immense advance we have made within the lifetime of the present generation.

OUT OF THE DUST-HEAP.

Going along the street the other day, our attention was drawn to a crowd of persons gathered round a waggon that had broken down, filled with a load of bones from a slaughter-house; or rather we should say of the cellular-like bony substance which forms the core of the bullock's horn. Seeing the driver near, we asked him of what use the substance was, when his answer opened our eyes to the value of the repulsive-looking refuse, as we thought it, which was fit only to be buried out of sight. "Oh, they bones, sir. They goes to the boilers to get out the fat, and that goes to make common soap." We thought at the time that it must require a deal of scenting to make it even bearable, but we said nothing, and the man went on, "And when they get all the fat out, the cores are mixed with acid and ammonia, and makes the best of manure."

We think it a remarkable thing to find the beautiful butterfly arising from the dingy-looking chrysalis; but we learn, on a little inquiry, that throughout the arts and manufactures, resurrections quite as astonishing are going on every day around us, on a large scale. Let us take gas-tar as one example. This material was of old considered a refuse product of gas-works, and was thrown away, very often into the rivers, where it floated about in blue patches, and was very unsightly and unhealthy, killing the fish and vegetation wherever it overflowed. This substance, like the ammoniacal liquor from the same works, is now highly valuable. We all know what a soiling substance gas-tar is; it is therefore all the more curious to find that by distillation it yields a material termed benzoel, a substance used for removing grease-stains, and for the general purpose of cleansing soiled substances. Another product evolved from this tar is naphtha, which forms a cheap light, though a dangerous one. Naphtha is also indispensable to the india-rubber manufacturer, as it is the solvent used by him for working this gum. Lampblack is also made from gas-tar. In Paris, and indeed in London, and in many of the towns in the North of England, the tar is mixed with sand and fine pebbles, and makes an asphalte compost, for use in roads and paths. We have also discovered that the ammonical liquor enables us to dispense with a foreign material which once was costly. Formerly this liquor was obtained from the sal ammoniac, which came from Egypt, where it was reduced from the manure of camels. It is now made in our gas-works, in the process of coke-making, and indeed from many other sources. We must not forget to mention that an oil is produced from tar which effectually preserves timber from rotting, and also that singular material, carbolic acid, which will no doubt be put to a great many uses in the future. At present it is known as a very valuable antiseptic.

Although not exactly a refuse of gas-making, we may here refer to a material which formerly was considered a perfect waste substance, taking up much room in all collieries. We allude to an aluminous shale, which is a substance always first gained in working all coal-pits. This substance is now converted into alum, largely used in the process of dyeing. Both dyes and scents are also produced from coal-tar by distillation, in combination with other materials. Picric acid is one of these; it produces salts of yellow or orange hues; and next come picaline, leucoline, and aniline, which has become of immense importance of late as an agent in producing the fashionable colour mauve. When distilled at a low heat, an oil termed "oil of meadow sweet" is produced, and others smelling like oil of cinnamon, oil of hawthorn, and oil of geranium. In short, gas-tar may be ranked among one of the most wonderful of raw materials, giving rise to scores of new substances in oils, which seem destined ever to go on multiplying.

Glycerine was formerly a waste substance in factories for making candles from palm oil. It used to flow into the Thames from the Belmont Works at Battersea, in quantities the estimated value of which was fully £20 a week. It is now one of the most valuable remedial agents that we have in all skin and ear diseases, and it has displaced the use of spirits as a means of preserving all forms of animal matter.

In the neighbourhood of all large smelting works, vast heaps of what is termed slag are produced, which, in some places, especially in the mining districts, rise into hills that are visible for miles around. This material—for we can scarcely call it waste any longer—is made in prodigious quantities every year. Its utilisation therefore is a matter of great importance. An American gentleman has taken out a patent for converting it into a building material of a very imperishable kind. He refines it from its impurities, and colours it so as to represent variegated marble, than which, however, it is very much harder. This substance will run in moulds; it is therefore valuable for ornamental work. But the American was not the first to perceive the value of the material for building purposes, as we ourselves have seen it largely used in the neighbourhood of Bristol—where, of old, there existed large smelting works—as the copings, and indeed in the buildings of walls themselves. Its durability is extreme, in consequence of its non-absorptive nature.

All old metal is, more or less, valuable for remelting, the precious metals, such as gold and silver, of course, being most carefully collected. The sweepings of boards and floors are regularly saved, and the dust preserved. Mr. Simmonds, in his work on Waste, tells us that "'jewellers' sweeps' is a general name for the scraps and dust remaining in silversmiths' and jewellers' workshops, gold-pen manufactories, and which are bought by persons who smelt them over again to separate the gold and silver from the refuse. Even the clothing, waistcoats, jackets, &c., of gold-beaters and other workers in the precious metals are eagerly bought up for the recovery of the fragments accumulated in them, and I have heard of fabulous prices given for an old waistcoat that had long been worn by a gold-beater. At any time they can obtain a new waistcoat for an old one."

Horse-shoe nails have long been famous as a material for the manufacture of rifle gun-barrels, which require great toughness. Horse-shoe nails are made of good iron originally, and this is improved by being banged by the horses upon the hard stones. The scrap iron from the needle manufactories is also collected for the same purpose, the very best iron only being used in this manufacture. The waste of the steel pen manufactories goes back to be converted into steel. The clippings of tin ware are valuable for reconversion into the two metals of which they are composed—tin and iron. The tin, which is the more valuable metal, is separated from the iron by an acid, and again restored to the metallic state; the iron, being generally charcoal-made iron, is of the most valuable kind. All scrap-iron goes to the melting furnace. In waste places we occasionally see old worn-out iron utensils, such as slop-pails, tea-trays, shovels, and the thousand odd things that are used in domestic life. All this waste is collected. All the fashioned articles are first subjected to heat for the purpose of extracting the solder, which is a valuable article. The old metal is afterwards sent to the copper streams, where it is deposited in the water and gathers the copper, which would otherwise run to waste; the more valuable metal adheres to the iron, and in course of time completely coats it and eats it away. Steel filings are utilised to make steel wine. In the Woolwich Gun Factory a vast quantity of steel and brass filings are made, which, in consequence of being mixed, were once valueless; but the steel filings are now separated from the other metal by the agency of rotating magnets, which take up the former metal and remove it with great rapidity.

No doubt there have been of late some very strange things utilised in Paris. The newspapers have given hints enough of the experimental diet of those from whom emanated the saying, "*Il faut manger*;" but a short time since a very singular trade had sprung up, for there the lower classes have not the same objection to use refuse food that our own have. Some years ago, an old soldier named Père Chapellier, who for some time followed the profession of a *ravageur*, one of those odd beings who still in that city rake about the central gutter of its back streets with a hooked stick and a lantern, perceived in the course of his business that when the *chiffonniers* came in with what they had collected, they always had a great quantity of pieces of stale bread, which they could not dispose of. Perceiving this, and knowing that a vast quantity of bread-crumbs are used by the cooks and the Parisians generally, he determined to establish himself as a regular preparer of bread-crumbs. He could not depend upon the chiffonniers, however, for a supply, so he made an arrangement with the cooks and scullions of the schools and colleges, and convents; and one morning he posted himself in the centre of the *Halles* (great market), surrounded with baskets full of bread-crumbs, and round his hat he placed, in large letters, the following announcement: "Bread-crumbs for sale!" The hit was tremendous; his trade increased, and presently growing ambitious, and ascertaining the wants of the cooks, he determined to turn bread-crumb manufacturer, and sold them two sous cheaper than any one else. We quote from Mr. Simmonds' work the sequel of this singular industry:—"He saw that in the bread he received there were two sorts, the good and the bad. He had thought of separating them, but then he found the profit would not compensate for the trouble. He determined to invent a new industry; he made *croûtes au pot.* Stranger, if you ever go to Paris, never order *soupe au pain au croûton,* except at the Trois Frères, Café de Paris, or Véfours. All comes from the fabrique of Chapellier, from the chiffonnier's basket, the college scrap-basket, the convent slop-tub. He has established, near the Barrier Saint Jacques, ovens which never cool, and from whence thousands of pounds of bread are daily poured forth to be sold as crumbs and crusts. A large number of women and children are busy piling and grating the merchandise as it comes out of the oven. The carbonised pieces and scrapings are pounded, sifted, through silk sieves, and sold to the perfumers to make tooth-powder. Nothing is more curious than the warehouses of Le Père Chapellier. They are immense buildings, where mountains of bread are received every minute. Workmen separate these pieces; on the right are those redestined for man, on the left those destined for rabbits. Wonderful order and cleanliness are everywhere visible. Young girls make up packages of *croûtes au pot*, after weighing them; children fill large boxes with the black powder."

We may just add that Le Père Chapellier himself is always present among his workmen, scolding, giving orders, laughing, joking, but always with the keenest of eyes to that main chance which has made him a prince among traders. He is a man of genius.

CHEAP TIME.

We have often heard a philosophical friend assert that such is the inclination of the human mind for uniformity, such the disinclination for fractions, that the time will come when all articles in popular demand will be reduced to a penny, a shilling, and a pound—or first, second, and third class prices. That the tendency is towards uniformity of this kind, we have examples in the penny post and a thousand other items the reader will easily call to mind. It is just possible that this tendency to accommodate the purse may have one disadvantage. Has the reader ever considered the enhanced value its unattainability gives to anything that is desired? Let us recall to the mind of the schoolboy the delight of opening for the first time his father's watch. The mystery of springs, wheels, &c., suddenly revealed to him; the delightful fragility which tempts his destructive powers; all these are sensations he never forgets; but the longing to be master of this delicate animated creature (for such it almost appears to him) is the most impressive sensation. It seems so unattainable; to be master of a watch, is to him tantamount to his being master of his manhood.

Alas! this longing for the unapproachable, the unattainable, is a thing of the past. Commercial enterprise has dragged down the watch to the level of his pocket-money. A watch that will go, that can be wound up, that has real works which you can see; none of your gilt trumpery such as we see hung upon Christmas-trees, or bought in the Lowther Arcade, but a veritable warranted timekeeper, that he can pull out of his pocket and consult with an air. Henceforth godfather's "tip" will no doubt take this form. When we say that these twenty-shilling watches are warranted, of course we do not mean in boys' keeping, but as watches they are, if properly taken care of, equal to any ordinary wear and tear to which they may fairly be exposed. Against boy-smashing-power, of course, Dent at his best would be unable to contend.

The secret of the cheap rate at which these watches can be produced, is the application of machinery to the production of the works in place of expensive hand-labour.

The history of Swiss watch-making would form an interesting chapter in the "Curiosities of Toil." The wheels are stamped, and then accurately cut by machinery. The details are sold in large quantities to the Swiss mountaineers, who employ their leisure time in the mountains when the winter shuts them out of other occupations. It must be a clever and delicate-fingered people who can thus at will turn from a pastoral to a mechanical pursuit. The sense of accuracy necessary to build up a watch, the nicety of touch required to adjust its delicate work, gives us a most favourable idea of the nervous intelligence of these mountaineers. Imagine Hodge, with his "fingers all thumbs," attempting to wind up a watch, much less constructing one, and there will be seen the differences of intelligence in many a similar class in life effected by education. But to return to these Swiss watches, of course there are different qualities. Boys are not found with a monopoly of them. They run from a guinea, the cheapest, to ten guineas in gold cases. From two to two and a half guineas, as good a watch as a man need have, as far as time-keeping goes, can be procured. Aluminium is the metal mainly used for the cheaper watches. This metal is very like gold in appearance, is very light, and wears well; but the owner must avoid the sea air and water, as they have a tendency to give a green tinge to the metal. In the cheapest watches the expense of the metal case is avoided, by constructing back as well as front of crystal glass, made very thick and strong. Through this glass the mechanism is plainly seen; the contrast of the steel frame with the works have a very peculiar appearance. These are the timepieces to take into a crowd. The disgust of a pickpocket who has just eased a gent of his watch, has not been overlooked by one of our comic contemporaries. "Blest if I know what the professhun's a-coming to. You'd a thought a respectable old gentleman like that good for a gold repeater at least; blest if it ain't hallyminum!"

PAVING EXPERIMENTS.

We all know what a capital thing is a well-made, smooth, macadamised road. Possibly nothing will ever be devised, for moderate traffic, nearer perfection. So great and immediate became its popularity, that not only did Mr. Macadam become Sir James Macadam, but his name actually gave at last a new defective verb to our language. But a macadamised road is only good when very good, and is altogether useless when subjected to the traffic of a leading London thoroughfare. When first laid down it is toilsome work—cruel work indeed—for the poor horses to drag through it, and many of them are lamed by the sharp granite fragments. Then it wears into mud with a rapidity which has always surprised those who have considered the subject, and it is really wonderful to see the amount which a few days' heavy wear will work up from granite. These roads have long been abandoned in our most crowded thoroughfares, and granite laid down in small blocks almost universally adopted; and for exceptionally heavy traffic, even this is found insufficient, and broad belts of solid granite are placed for the use of the more ponderous vehicles. The noise, jolting, and expense of this description of paving, make surveyors as well as travellers anxious to find a substitute, and in this quest several important experiments have been made.

For some time cubes or hexagons of wood were employed rather extensively, but were soon pronounced a failure. As regards absence of noise, and smoothness in riding, they were very good, and there was little or no dust; but in wet weather, or, above all, frosty weather, they were dangerous in the extreme; and cab-drivers would willingly make a circuit to avoid a street paved with wood. The blocks wore away very fast, too, and wherever there was formed an indentation, in which the water could stand, they rotted faster still.

About the same time, some thirty years back, asphalte was tried, and had a moderate success. The Seyssel Asphalte Company will be remembered as having laid its composition, besides other places, at the bottom of the Duke of York's Steps, St. James' Park—a capital spot to try a paving only intended for foot traffic; and even its warmest supporters scarcely believed in its capacity to stand the trial of a London roadway. Asphalte, as we all know, is a kind of pitch or bitumen, and will readily, when warmed, assume any form, and adhere toughly. Being completely impervious to water, it forms, when mixed with sand or chalk to give it consistency, the best possible lining to water-tanks, and is largely used for them, or the flat roofs of houses; and consequently seemed very well adapted for foot-paths. But it did not wear well; it was always getting in holes, and leaving what has been called its "bones" bare, which in their turn kicked out and extended the damage. The fact was that this was a kind of asphalte-and-gravel soup, boiled in a cauldron on the spot, poured in a liquid state upon the prepared floor, and which bound together excellently when it cooled; but the friction of the gravel stones soon ruined the asphalte, and this was abandoned.

Another experiment is now being tried, and this of the most ambitious description. The Val de Travers Asphalte Company have obtained permission to lay down their material in various parts of the city, and it is certainly venturing on a safe prophecy to say that if it will stand the traffic here, it will stand any traffic in the world.

The men employed in laying down the asphalte, work under a large awning or tent. This extends from side to side of the road, and is supported by poles, to the bottom of which wheels are fitted; and as the new road stretches itself yard by yard, so the awning is pushed along. Under the tent there is a large cauldron filled with burning coke, and standing on the top of the fire are a number of large flat-irons, fitted with long wooden handles, which tools play a very important part in the work, as will be seen. A little way beyond this stove the concrete bed suddenly terminates; it is hidden by the new roadway—a dark crust some three inches thick, perfectly smooth, rising slightly in the centre, and which looks as hard and sharp as iron at its edge —looks, indeed, not unlike a bed of iron.

The men, having finished the preparation of the concrete bed, are awaiting the arrival of more material, and meanwhile it is as well to notice how carefully this concrete is prepared; it is, of course, this which is arched, and from it the asphalte takes its form. When the granite blocks are removed, the bed then exposed is levelled, and two or three banks of sand, gravel, and tolerably large pebbles mixed together and wetted are formed; into the interstices still remaining, and upon the surface, is poured and spread Portland cement. These banks enclose small areas which, after the boundaries have settled and hardened, are quickly filled with a kindred material, and then, as fast as each section is completed, it is carefully levelled with rods, so that the necessary rise in the centre shall be given; then all is ready for the asphalte.

To the surprise of most strangers, this makes its appearance in the form not of a liquid, but of a kind of mould, looking, as it is wheeled in the barrows, uncommonly like soot. It is prepared hard by, so that it arrives in the iron tanks or carts very hot; and here is shown the grand difference between this and every preceding experiment. Other compositions bearing the same name have always looked like liquid pitch, or tar, and resembled it in many respects; being, indeed, found nearly identical on analysis.

The chief depôt of true asphalte is in Trinidad, where there is a lake furnishing an exhaustless supply of what is known as "Trinidad pitch." But the substance now on trial is a rock or earth, only partially bituminous; it is, in fact, a rock broken into fragments, thrown into a huge cauldron under which fires are burning, and crushed while there into this sooty mould by rollers—as by a pestle in a mortar, or as large builders crush their lime—and it is then fit for use. The method of laying it down was well shown when Cheapside was thus paved. The cart drew up where one of the narrow side-streets enters this thoroughfare, and the men, who have been lying wearily about, start into activity at once. Some of them wheel barrows along a line of planks laid down for the purpose, and return with their smoking loads, which they shoot down in front of the iron crust before described, and then two or three men come forward—they are the workmen sent over by the foreign company—and each brings one of the heated irons. The black earth is shot first so as to cover the frontier of the new road at each corner, or kerb-side, and then these men, standing on the asphalte, punch the new material with their heated irons.

You see at once that everywhere they touch becomes immediately smooth and flat, and smokes under the contact; and as all their attention is directed to the edges, you see also that they are pounding the new stuff to the level of the roadway just made, and welding the two together. That which is already down fuses and blends with the new, so, even while you look, the place of joining is utterly lost—no seam showing where it was. The sound of this downward hammering seems to argue the solidity of the work, for although the edges give to the heat, yet the first sound of the blows is very much like the ring of iron upon iron.

Then come other men—English, or possibly from a country a little farther west even than England—and these bear irons of different kind, larger, heavier, having for their bottom not a bar, but a disc of iron as big as a dinner-plate. With these they begin to punch and smooth the new mould, but only after another Frenchman has carefully raked over the material, until it is pretty nearly the required height, has smoothed it with the solid back of his rake, and thrown away all hard knobs he may have found. The black earth hisses and shines under the scorching irons, but hardens instantly, so that the men tread on the spot they have just been pressing. I observed, however, that all these latter workmen wore only carpet slippers, lest harsher boots should excoriate the yet tender skin of the new road; and there is something very thoughtful, very French-like, in this precaution.

At the rate of about six feet in half an hour the road advanced. A line, about three inches above the level of the concrete, is marked on the front of the kerb-stone, and to this on each side the Frenchmen work; and so true is the raking of the mould that no levelling, save by the eye, is required.

AN ELASTIC SUBJECT.

How many materials there are in use among us, that are doomed to serve inferior purposes for a lengthened period, until at last some new discovery calls them forth to larger and more important service! Let us take as an example the vegetable product called caoutchouc, or india-rubber. This gum was for many years a very Cinderella among other natural products destined to do the drudgery of rubbing out the false lines in the school-girl's pencil-drawings. Even upon this service it has only been employed, say, a couple of generations, inasmuch as the first notice we have of it is contained in Dr. Priestly's work on perspective, published in 1770, where he mentions its qualities in this respect, and moreover informs us that at that time it sold at the extravagant price of three shillings for a piece half an inch square. Who would have imagined that this dingy-looking substance was destined to play a great part in the world, to be elevated to most important duties in the spread of civilisation, to subserve to the purposes of man in his most subtle designs, and also in the common purposes of his life? The same material that imprisons for thousands of miles the electric current, that carries man's thoughts across the globe and under the deep ocean, serves to ease the pain of the teething child, or supplants the wrapper of brown paper in tapping a beer-barrel. Indeed, there is scarcely any use which it cannot supply in either its soft or hard state, and it is daily displaying its protean qualities among the arts and sciences.

India-rubber, as we have before said, is a vegetable gum, obtained by tapping a tree growing in tropical regions. It appears to be an almost inexhaustible product, for, notwithstanding its enormous consumption within the last ten years, the supply is becoming more plentiful every day. The best caoutchouc comes from Peru and South America, but it is also obtained in the East Indies, and we have no doubt that Africa could yield vast supplies of this valuable commodity. Many of its good qualities have been for ages known to the savage tribes inhabiting the countries where it grows, but its vast capabilities are only brought forth by careful manufacture. The boy, who first chewed a piece of rubber in his mouth until it became a sticky morsel capable of being employed in that interesting youthful pastime, making bladder-pop, was the first instinctive manufacturer. The very processes he called in for that purpose in his mouth, are the same as those employed by the manufacturer, who manufactures it by the thousands of tons annually. Powerful machines, as we shall presently show, do the work of the youth's grinders, and in this as in many other things, we have an illustration of Wordsworth's profound remark that "The child is father of the man."

One of the largest establishments in the world for the manufacture of india-rubber is known as Silvertown, a splendid factory situated on the Essex shore of the Thames, just opposite Woolwich. The founders of this establishment, the Messrs. Silver, gave the name to this singular hive of human industry situated by the river-side, but it soon grew into an establishment too large for the management of a single firm, and it is now converted into a limited liability company, the main item of the manufacture consisting in telegraphic cables, requiring the employment of an enormous plant and a princely capital. The raw material comes over in lumps, produced by the adding together of sticks of an irregular shape, formed by the gum as it exuded from the tree. This gum is, when received, full of dirt of all kinds, which has to be cleaned away before it is fitted for the purposes of manufacture. The first process is to cleanse the rubber of these impurities. It is softened by warm water, and then ground up, masticated in short, in an iron case in which iron rollers revolve at different velocities. In these masticators it is ground and chewed for hours, until the rubber is not only cleansed, but is worked into a sticky pulp, perfectly smooth in texture. In order to prepare it for the production of solid sheets, it is now placed in an hydraulic press, where under immense pressure it is condensed into a solid bulk or block. It is now cut into sheets of any required thickness, by being pushed against a cutter working with a drawing lateral motion. It is very pretty to see the films of rubber detached by this machine, with a delicacy far beyond the power of human hand-work. The larger portion of india-rubber, however, is not used in the solid form, but is treated whilst in the masticating machine with sulphur, which has a very remarkable power of giving it increased elasticity; but in order to work it, a temporary plasticity is given by the addition of naphtha. Rubber thus mixed is known as white rubber, familiar to the public in the form of the macintosh. The naphtha makes it into a dough, which is placed so as to run between iron rollers, which spread it into the delicate macintosh sheet. As it is necessary, however, to restore the elasticity that has been destroyed by the temporary application of naphtha, it is passed over a hot steam chest which rapidly vaporises the latter, and the india-rubber now becomes perfectly firm.

In the process of making ebonite, a material possessing qualities nearly the opposite of vulcanised india-rubber, a larger proportion of sulphur is added to produce this transformation, and it is submitted to a great heat for some hours. This baking process transforms it into a dense dark brown substance, now familiar to the public, and which is used in a thousand different ways in the domestic arts. Ebonite is more like a dark wood than any other material, but it possesses the advantage of being lighter than ebony or boxwood, although quite as dense in substance. Again, it is slightly elastic, and it does not break by falling to the ground, a very great advantage. It is turned in the lathe as shapely as ebony, and doubtless will take the place of that wood very largely. When in its soft state, it is simply moulded like clay and then baked. The manner in which this new material is taking the place of wood and metal, is quite surprising; its cheapness and endurance, and the ease with which it is manipulated, giving it advantages with which neither of the other substances under many circumstances can compete.

The protean changes which take place in india-rubber make it one of the most extraordinary substances of the day. Let us compare, for instance, this dense hard ebonite with the thin sheets of vulcanised rubber used for the purpose of enlarging and condensing maps and pictures, a use to which it has been applied of late with admirable success. In the Ordnance surveys, for instance, it has been applied very effectively in this manner. A sheet of well-manufactured vulcanised rubber may be considered to be equally resilient throughout; accordingly, by fixing a sheet in a frame it may be stretched to any required size (within certain limits) with mathematical accuracy. This quality has been taken advantage of by Sir Edwin James, the Director-General of the Ordnance Department, to accomplish a long called-for demand for an increase in the size of the surveys. These were originally made on the scale of one inch to a mile for the country, and six inches to a mile for the towns, a rate long admitted as too small. To enlarge them by redrawing would entail a cost the Chancellor of the Exchequer would never tolerate; but india-rubber has done it for us, so to speak, for nothing. Twenty-five inches to a mile for towns is now the scale adopted, and worked to in the following manner:—A piece of prepared india-rubber, faced with a surface that will take lithographic ink, is fixed on a frame with screws and stretched according to the scale required. The mass, we will say, is expanded to five times its original size, and when the adjustment is finished it is taken from it in the customary manner, and printed upon the lithographic stone.

Reductions can be made in the reverse manner; that is, a copy of a map or drawing is printed upon a sheet of rubber that had previously been expanded to double its size. When the pressure is taken off its edges it shrinks to its original form, say from ten inches to five. In this way contractions or enlargements are made with the greatest accuracy, perfect facsimiles indeed being the result.

The transfer of old books in different sizes by this method is perhaps one of its most valuable results. Photography has already accomplished this for us, it is true, but it is far more expensive than the rubber process. It is a curious fact that type-ink does not dry so perfectly as to render it unfit for the purposes of the lithographer, for a time which to the general reader may appear almost inconceivable—say a couple of centuries. Indeed, volumes of this age have been reproduced by this method. When we recollect the number of works of that period, for which the demand for facsimiles is great, we can appreciate the value of this rubber transfer process.

The construction of a telegraphic cable is a very interesting process. The first step is making what is termed the core, or conducting agent, of copper wire. The earlier cables were generally made with one conductor of thick wire, but it was found that—to use a popular saying—this plan was the mistake of putting all the eggs into one basket. If this thick wire were to break, an accident to which it was very liable in the act of laying it, there would have been breach of continuity, the tongue which talks under the ocean would have been struck with paralysis. In order to avoid this, a strong central wire of the best copper is used, and round this a number of fine wires are twisted. By this method the fracture of the central or base wire is no longer of importance, as the small wires, even if there was a strain upon the cable, would carry the current. Indeed, we have seen cables that have been broken and dragged asunder many inches, still telegraphically perfect, for this reason. The twisting of the fine wires round the central one is very similar to the making of ordinary rope. In order to insulate the conductor, thin slips of india-rubber ribbon are carefully plaited over it. It is curious to watch the machine at work at the process, which must be done with the greatest care, inasmuch as a small hole, by means of the eagerness of the electric fluid to escape through it, speedily becomes a big one. When the whole length has been thus plaited, in order to secure the edges the cable is passed through a tank of liquid india-rubber, which cements them together. The core has now to be armoured, when protection is required for deep or rough seas. This is done by laying stout iron wires longitudinally and parallel with the core; but these, again, have to be protected against the action of the salt water, which is done by a plaiting of hemp, a coating of tar completing the process. When excessively rough or rocky shores have to be guarded against, the shore-ends of the cable are protected by several additional layers of wire armour and hempen guards. When accidents happen to cables after they have been laid, the cable has to be fished up, and the fault found and spliced. The finding of a fault in the deep ocean may appear to the reader a very difficult, nay, an impossible operation. For instance, to have to pay in the Atlantic cable, and examine it inch by inch, in order to discover possibly a mere pinhole, would seem to be a very labour of Hercules. But science is equal to the task; the electrician sitting in his room at his instrument, by means of delicate appliances, can estimate to within a mile or two the distance at which the fault rests. If in the "Arabian Nights' Entertainments" the task were given to discover the place of a break in a wire running under two thousand miles of ocean, it would appear more wonderful of accomplishment than any other feat mentioned, and some poor geni or witch would have been called in to solve the difficulty. But science is the wonderful geni of modern life, and it accomplishes more apparently impossible tasks than any of the romance-writers of old could even imagine. Nevertheless, as we have said before, every precaution is taken to prevent these ultimate appeals to science; for the lifting of a deep-sea cable is no child's play, and the cost is great, consequently every precaution is taken to secure the perfect insulation of the cable whilst it is being manufactured. Before one of these marvellous talking wires is accepted by the purchaser, it is required to test up to a certain given point; and in order to secure this, there is an artisan rejoicing under the name of the fault-finder. We may mention that this officer is employed in the portion of the factory where the insulation is made not by india-rubber, but by gutta-percha. When this insulation is used, the liquid percha is moulded on to the conducting wire as it is passed through a die, hydraulic pressure forcing the material round it in a hard dense pipe, which looks very like chocolate. The wire thus insulated, as it is wound off, passes through the hands of this fault-finder, whose fingers, educated by practice, feel any little air-hole that may have occurred in laying on the gutta-percha. Directly this is found a hot iron is applied to it, and it is stopped. Far more amiable than the social fault-finder, who generally exaggerates any defects he may find, this "intelligent-fingered" artisan's whole life is employed in making clear and perfect the speech of one nation with another.

The temptation to cut telegraphic cables during war always renders them liable to actual violence, hence it is the practice to place them in deep water when possible, out of the reach of unskilled persons. It requires well-practised hands to find and grapple a cable, and appliances which are not at the command of the ordinary military engineer. The late war left signs of its ravages under the water as well as upon the land. Whilst looking over the factory at Silvertown, we were asked to inspect the French cable just arrived from Dunkerque, where it had been damaged by the belligerents. It had been hacked about in a fiendish manner, evidently by some desperate hand. The fractures had to be remedied before it was returned. The process of re-splicing is simple enough. The ends of the conducting wires are filed off in a slanting direction, they are then placed in apposition, and soldered. Round this solder fine wire is bound, lest the solder should crack, in which case the binding wire would still manage to carry on the message.

To return, however, to the application of india-rubber to the innumerable purposes of common life to which it is now applied: when great resisting power as well as elasticity is required, as in the hose of a fire-engine, this is gained by the building-up process. Thus, a layer of india-rubber is laid upon strong canvas, and this alternation of the two materials is repeated until the required strength is attained. It would be almost impossible to specify the various uses for which this material is now employed. It is taking the place of steel where springs are required; the surgeon uses it to prevent evaporation; it is used as door-mat and scraper. Our readers will remember those cell-like grey structures, like a gigantic slice of honeycomb. These are made in a very ingenious manner. A thick sheet of rubber is cut in alternate slits of about three inches long. When the sheet is stretched these slits are spread open; they are kept stretched by a frame, a border is put round, and it is then subjected to a great heat, which fixes it in the form we see it in. Tubes of all kinds, from the garden waterer to the stethoscope with which the physician sounds the chest; brushes which are employed to do the coarser work of the scavenger, and the more delicate work of the lithographer; water buckets, baths, splints for the adult and corals for the teething child. There is scarce an age or a condition in life to which its uses are not made subservient. It drives our machinery, it stops our doors, it guides our billiard-balls, it makes dolls for our children, it makes foot-warmers for our old ladies, stoppers for our bottles. But we might go on with our inventory for a couple of pages; suffice it to say that this article and gutta-percha have made a revolution in scores of old and once important trades.

LONDON FIRES, AND FIRE-ENGINES.

In "a province covered with houses"—for such this metropolis is—the element of fire is an enemy which requires the most watchful attention. There is never a day in which some conflagration does not take place, and often there are as many as half-a-dozen calls at the fire-engine stations on the same night. London proper is a vast warehouse, where all the elements of the most devastating conflagrations are assembled. It is true we shall never see a second great fire again, inasmuch as most of the wooden houses were carried off in the great blaze of 1666; and, what is more to the purpose, the law which compels every building to be isolated from its neighbour by a strong party wall, will always prevent any fire from getting such a mastery as it did of old; but nevertheless there are still many dangerous structures in the city, which are the dread of the firemen. The great warehouses, for instance, contain such a large quantity of the most inflammable goods, that if a fire were once to thoroughly establish itself in any one of them, it would be most difficult to cope with it. It will be remembered that when Fennings' wharf took fire, the score of engines present played upon it with no more effect than so many penny squirts. Such was the fury of the flames that they leaped across Tooley Street, and invaded the river-side wharfs at a considerable distance. As long as those vast stores of inflammable materials are allowed to be heaped together in one building, London can never be safe from great fires. In the Building Act passed in the present reign, an attempt was made to obviate this source of danger by the provision it contained, that no warehouse should exceed two hundred thousand cubic feet in contents. If the word "building" had been used instead of "warehouse," this would have been a very valuable enactment, but as it stands it is practically inoperative. For instance, since the passing of this Act, many large Manchester warehouses have been erected, the contents of which have very much exceeded this limit. The law has been set at defiance, on the plea that as bulk is broken in those buildings, they no longer can be called warehouses, but places of business. This reading of the law the city surveyor has never dared to dispute, and in consequence of this small technical error a vast amount of property is placed in daily jeopardy, and no step has been taken to set the matter right. The late Mr. Braidwood himself informed the writer that the vast pile of warehouses on the south side of St. Paul's Churchyard, known as Cook's warehouses, are the most flagrant offenders in this particular, and their situation is such that they threaten on the one hand the great metropolitan Cathedral, and on the other Doctors' Commons, the rotten old quarter where the wills of millions of deceased persons are deposited for security! It may seem an imaginary danger, as regards St. Paul's Cathedral, but the experienced fireman takes quite a different view. If the Manchester warehouse we have mentioned, containing one million one hundred thousand cubic feet of the most highly inflammable goods, were to take fire, its vehemence would be so great that there would be no contending with it, and the floating pieces of cotton goods would, if the wind came from the west, most inevitably be wafted across to the dome of the Cathedral, which is composed of timber, with but a slight lining of lead. Under such a heat as would be given out by a lodgment of burning cotton goods on the balustrade of the dome, this lead would speedily melt, and the dry timbers underneath would ignite in a trice, and the whole body of the building might speedily be involved. If the wind were in an easterly direction, the pile of old buildings, with continuous roofs, dry as the law they cover, and in which the wills of the great mass of Englishmen are deposited, would be consumed without any doubt. In either case, a calamity so overwhelming that we scarcely like to contemplate it, would be the result of the error of a word in an Act of Parliament. As the houses in the City are adding many cubits to their height, the danger from fire, both to life and building, is increased, as the element, of course, makes its way upward with the greatest facility, and in cases where the height is very great, and well staircases are provided with a top light, a thorough draught is instituted, which makes the danger vastly greater. We question if any of the old hand-engines could throw water to the top-floor of many of these structures, which are full ninety feet in height, and the fire-escapes would, we feel sure, all fall short, and be comparatively useless. The only remedy for the great altitude to which houses are now rising, is to build them with fire-proof ceilings, such as is now being done with many of the new houses in Westminster. By this means fire can only have access to very limited areas, and can therefore be dealt with easily enough. All modern Paris is being constructed in this manner, and the consequence is fires are very much less frequent there than in London, and houses are but rarely burned to the ground. The use of iron and stone which is becoming so general in all better-class buildings, is a great security against fire in ordinary houses where the areas are small, and the use of these two materials affords absolute security where danger from the exterior is concerned; but neither iron nor stone can withstand the attack from within of large bodies of fire—the iron, in the form of beams and pillars, melts like so much sealing-wax; and when red hot, and touched by the water from the fire-engine, it is apt to snap in a moment. Stone, again, flies with the overwhelming heat of a great conflagration. Brick is by far the safer material, and common plaster resists fire with the greatest tenacity. The ceiling of a room will often resist for hours the action of flame, and preserve quite cool the laths immediately beneath it.

The causes of fire are sometimes very curious. For instance, who would think that it would ever arise from hot water? But nothing is more certain than that many extensive conflagrations have been occasioned by the hot-water pipes with which buildings have been warmed. Hot-water and steam pipes are often heated at a very high rate; three or four hundred degrees is sometimes attained, and the consequence is that any wood which is used to support such pipes speedily becomes charred, and so dried that it gives out a most inflammable gas. The late Mr. Braidwood has given evidence to the effect that a heat not exceeding two hundred and twelve degrees, if long applied, would ignite woodwork. It is true, a period of many years is required to bring wood to this condition; but a hot-water apparatus is put up as a part of the fixtures of a house, and is expected to last as long, and all the time, it must be remembered, it is producing its effect out of sight.

If fires arising from water in the form of steam, or circulating through pipes, can be accounted for satisfactorily, how shall we make out the cause of fires arising from a high tide? Yet under this heading several have occurred, according to a return made by Mr. Braidwood. One can understand how a high tide may put out a fire, but it certainly is a puzzle to understand how it could bring one about. In this wise: in many of the river-side wharfs large quantities of lime are stored; the overflow of water into these stores of course produces at once a great heat, which is, however, harmless, so long as it only comes in contact with wood; but when iron is presented to the lime in this manner, after a time it becomes red-hot, and fires whatever it is in contact with. The Fire Brigade which existed before the transfer of the fire-engines to the Board of Works, kept a register of all the causes of fire, so far as they could be ascertained, and in this register the loss of several boats laden with lime is mentioned, by reason of the iron knees and bolts thus heated by slackened lime burning holes in the bottoms of the barges.

Gas, as might be expected, is a fertile source of fires; and it appears that nearly a thousand conflagrations could be traced to this source since the establishment of the brigade. Lucifer-matches, also, have caused a large number of conflagrations; wax matches in particular are dangerous, not from being trodden under foot, but from what cause does our reader think? Through being carried away by rats and mice to their holes behind the lath and plaster, and then gnawed until their teeth touched the phosphorus, when, of course, the friction lights them. Bug-hunting is debited with fifteen fires; curtains taking fire with two thousand five hundred and eleven; candles with eleven hundred and seventy-eight; and smoking tobacco with one hundred and sixty-six. Naphtha lamps being upset caused fifty-eight fires, and spontaneous combustion was the hidden cause of forty-three fires—and how many more deponent saith not, inasmuch as in such cases the evidence is generally destroyed in the fire itself. The public little imagine the danger arising from refuse materials when heaped together under certain conditions. Oiled rags, such as enginemen use for cleaning their engines, occasion many of the fires that occur at railway works and stations. Oil dropping upon sawdust will cause spontaneous combustion, hence the frequent fires which occur in saw-mills. Incendiary fires, for the sake of recovering the insurance, are very frequent among the small shopkeepers of London. The insurance offices, however well they may be acquainted with the fact, never prosecute unless they have the most conclusive evidence. It often happens that the very great care taken to conceal the act of incendiarism leads to a detection of the crime, or at least to sufficient evidence to convince the firemen of the truth. "Reading in bed" causes many fires; children playing with fire, and intoxication, figure for many; lightning is given as the cause of eight registered by the brigade. "Unknown" is the return made for all cases of doubtful and wilful firing, and in this list upward of fifteen hundred are numbered.

The liability of certain trades to fires is a most interesting inquiry. It appears that the lucifer-match manufacturers stand at the top of the list as liable to conflagrations, no less than thirty in a hundred of them having been destroyed within a period of fifteen years. Next come common lodging-houses. When we remember that the inmates of these establishments are very numerous, the reason for this liability to fire is evident enough. Hatmakers' work-places are very liable to take fire; the shellac stoves, and the material used in the manufacture of hats, render the occurrence of fires very frequent among them. There are certain trades which are so dangerous that the insurance offices will not insure the premises in which they are carried on at all. Gunpowder dealers, hatters' stock in the stove, floor-cloth manufacturers, lucifer-match makers, varnish-makers, and lampblack-makers come under this heading. The hazardous buildings are very numerous, and include all those in which highly inflammable materials are used in combination with fire. Private houses, especially the better class ones, but rarely take fire, and it is still more rare to find one burnt to the ground. A comparison between a given number of houses on the north bank of the Thames, and the same number on the south, shows that the Surrey side is by far the most liable to fires; this is owing to the number of old wooden houses that still remain on the Surrey side of the water. On the Middlesex side these timber structures were all swept away by the great fire, consequently no legacies of an inflammable nature are left to us in the better half of the metropolis.

There is but one absolutely fireproof building in London—possibly in England—and that is the new Record Office in Fetter Lane. Stone and iron are here employed, but the structure is cellular, no room within the building being more than seventeen feet by twenty-five, and seventeen feet high; consequently, if every fireproof room were to be set on fire simultaneously, so small would be the body of flame that it would have no effect upon the solid fabric. All these rooms are perfectly distinct from each other, opening into a vaulted passage by means of iron doors; they are, in fact, large iron safes, and we may depend upon the absolute safety from fire of the papers entrusted to them. Why should our wills be allowed to remain in the fire-inviting precincts of Doctors' Commons when absolute safety is thus procurable?

The time of year at which fires preponderate is not probably according to our preconceived notions. There are, of course, many and destructive fires in the winter months, when all the multifarious apparatus for warming buildings are in full play; but by far the most destructive fires occur in the summer and the full blaze of autumn, when woodwork is desiccated and prepared for fire. This season is especially that of fires in the United States and Canada. The former country has of late years witnessed some fearful fires, compared with which those in our own country are mere child's play. The time of day at which fires are first discovered has been noted by the officers of the old fire brigade. From their experience, ten in the evening is the hour at which most of the great conflagrations break out. This is accounted for by the fact that in all manufactories that hour would allow of the fire, which it must be supposed first begun on the departure of the workmen at six o'clock, having made sufficient headway to be perceptible from the outside.

The machinery for the extirpation of fires is kept in better working order than any other metropolitan arrangement. Of old, the duty of extinguishing fires fell practically upon the Fire Brigade, which was an establishment maintained entirely at the expense of the different metropolitan insurance offices. It is true that every parish had its fire-engine, but it was always locked up, and was never at hand when its services were required; whereas the fire-engines of the insurance offices were always at hand, the men to conduct them and the horses to convey them to the fire being ready at a moment's notice.

In years past every insurance office worked its own engines, without regard to any plan or combination with other engines; consequently, there was much jealousy and loss of power in their action when any great occasion called for combined movement. This weak point in our defence against fire was obviated in 1833 by the establishment of the Fire Brigade, which was placed under the control of the late Mr. Braidwood. But this arrangement, although very advantageous to the interests of the insurance offices, as it tended to save insured property, was not altogether good in a public sense, inasmuch as the companies, acting in a trading spirit, only located fire-engines in the neighbourhoods of those who insured. It is true they never failed to go to any house on fire, insured or not, when called upon, but the very fact of their stations not being equally distributed over the metropolis caused a great loss of property and often of life in outlying neighbourhoods. This led the Government to look upon the question of dealing with fires as an imperial duty, and consequently an Act was passed a few years ago, by which all the fire-engines of the insurance companies, and also of the different parishes, were entirely transferred to the Metropolitan Board of Works.

Immediately upon this step being taken, fire stations were opened in every convenient position of the metropolis, including the suburbs. In those stations engines are always ready to start upon the first call in three or four minutes. Within these last two or three years the necessity for reaching greater altitudes with the jet of water has led to the introduction of steam fire-engines. The most powerful old hand-engine was only capable of throwing a stream of water to a height of seventy feet, and that but feebly;, but the "steamers," as they are termed, can throw twenty-five thousand gallons a minute to a height of two hundred and fifty feet, and there are two very powerful engines which can throw one thousand gallons a minute a height of five hundred feet if required. These most efficient tools give the fire-engine men the greatest confidence, and high as some of the great warehouses have grown, they feel that their increased power will enable them to deal with any height, if called in time. These steamers, twenty-five in number, are always kept ready. A jet of gas under the boiler keeps the water up to one hundred and seventy degrees of heat day and night. The fires are also built in the furnaces, and it only requires a light to be applied to raise the steam to its full force in a few minutes. From the first call for the engines, they are horsed, their men are at their posts, and the fire is lit in three minutes—a celerity which no other city in the world can match. The steam, which is getting up as the engine progresses, is always ready before the fire is reached. The old hand-engines are also employed as supernumerary aids, but we do not fancy that many more of them will be built. The whole police force are always on the look-out for fires, and certain rewards are given to those who bring the first information of a fire to the station. At certain posts, in central and commanding situations, such as London Bridge and the Shot Tower, fire watchmen are posted as look-outs every night.

The excitement with which a fire fills men's minds is extraordinary; we need not therefore feel surprised that it has of late become the fashion to form volunteer fire brigades. Possibly the example was first set in England by the Duke of Sutherland, who has a private engine near his own house, and his Grace is generally to be seen at any extensive fire, the most energetic and active of the excited multitude on the scene on such occasions. The Prince of Wales has also on many occasions been present with him, and it is understood that the duke gives a reward to any person bringing him information of a great fire. In New York it has long been the fashion to form volunteer fire brigades, and possibly in this respect the New World has given a hint to the Old. There are several of these volunteer brigades formed in the suburbs of the metropolis, in some cases in connection with rifle corps, and these brigades possess powerful steam fire-engines of their own. Our youth may assuredly do much more foolish things than enroll themselves in these brigades. We question if a review day affords half as much excitement to the Volunteers that a fire does to these volunteer firemen, and the fury of the scene is probably equal to that of a real battle field.

A very necessary and useful adjunct to the fire-engine is the fire-escape. This consists of a ladder which may be said to slide telescopically to suit the height to which it is applied, and a long tube-like bag of sail-cloth steeped in alum so as to resist the effect of flame. The long bag of canvas may appear a very dangerous means of reaching the ground from a great height, but it must be remembered that it is always inclined at an angle, and as it bulges with the weight of a person inside, there is always sufficient friction thereby produced to prevent a too rapid descent. Among the hundreds of persons rescued by means of these valuable contrivances, no accident has ever occurred by the mere rapidity of the descent, and the only casualties that have been recorded have been owing to a sudden outburst of fire destroying the canvas, and letting the persons inside through—an accident, we may remark, of the rarest possible kind.

There are at least sixty fire-escape stations scattered throughout the metropolis. As even these, numerous as they are, may not always be sufficient when life is in imminent danger, let us conclude this article by giving some hints gained by the experience of the late Mr. Braidwood, as to the best means for preserving life on such occasions, which, though pretty well known, can hardly be too often repeated:—"Be careful to acquaint yourself with the best means of exit from the house both at top and bottom; open no more doors and windows than are absolutely necessary, and shut every door after you. There are always from eight to twelve inches of pure air close to the ground; if you cannot, therefore, walk upright through the smoke, drop on your hands and knees, and thus progress. A wetted silk handkerchief, a piece of flannel, or a worsted stocking drawn over the face permits breathing, and to a great extent excludes the smoke. If a woman's clothes catch fire, let her instantly roll herself over and over on the ground; if a man be present, let him throw her down and do the like, and then wrap her in a rug, coat, or the first woollen thing that is at hand."

FOGS AND SMOKE IN LONDON.

The reader may, perhaps, have experienced the desolate sensation that comes over a stranger upon entering London in a November fog. I remember as though 'twere yesterday coming up from the far West, I need not say how many years ago, and shouldering my way out of the Paddington Station into the thick of a London fog. Oh, the desolation, the despair that overcame me. I was to live here for the rest of my life—in this atmosphere, so thick that if I were to jump up it would be dense enough, I thought, to support me in mid-air. I dare say my own feelings have been experienced by thousands of other young men "up from the country," as they passed under the black canopy as into a land of bondage. Why is it such a compound as a November fog is specially mixed up for the great metropolis? In the Black Country, as Wolverhampton is called, where the chimney-stacks are set as thickly as the masts of vessels in a dock, no one ever saw such a black cloud soaked into the air—penetrating not only every street, but taking possession of every room, and making its way down every throat—such as we see, and come at last to look upon as normal weather throughout this dull time of year in the British metropolis. Possibly this weather may be looked upon as a kind of stock property, invented for the purpose of enhancing the in-door delights of feeding, which sets in just at this time with unusual severity.

Be that as it may, fog at all times is a specialty with Londoners. And it comes on generally with an east wind, which gives the town the benefit of all the manufacturing districts situated down the river. But a simple fog is one thing; parti-coloured fogs, such as we are favoured with during the dreary month of November, are quite another. By turns we have seen these fogs brown, green, orange, and slate colour, and when those chameleon changes have been gone through, a mixture of colours, which has been likened to a bad bruise, winds up the whole display. The smoke is, doubtless, the agent to blame in the production of these lugubrious tints, and when we consider the large amount of carbon we send into the air by way of the chimneys, they are not to be wondered at. There are upwards of five hundred thousand houses in the metropolis, and if we debit each house with three fires, that gives us a million and a half of reeking chimneys. When in combination with a fog, such a mass of finely-divided coal as must escape therefrom easily accounts for the almost total darkness which overtakes us in the midst of our avocations sometimes very early in the day. It has been estimated that the amount of coal that finds its way into the atmosphere of London by way of our chimneys is not less annually than two hundred thousand tons, and we think this is under rather than over the mark. Here is a direct waste of nearly a quarter of a million of money every year, and what the indirect waste may be, in consequence of the filthy condition to which everything is reduced that is exposed to the weather, we dare not estimate. Foreigners accustomed to the clear atmosphere of their cities, in which, up to a very late date, wood was the only fuel used, behold with astonishment the black and smudged appearance of all our public buildings, and especially of our statues, where we have been daring enough to make them of anything lighter than bronze. A couple of hundred years ago London was as clear as any Continental capital; nay, at five o'clock in the morning, we can believe the old pictures of London by Canaletti, which give us Thames river scenery having all the lucidity of the Grand Canal at Venice. But then, when he painted amongst us we only used annually two thousand chaldrons of coal, a very small portion of which escaped into the atmosphere, as there were no manufactures located in our midst then. A hundred years later this quantity had increased to five hundred thousand chaldrons. From this period the use of coal has been increasing at a greatly accelerated ratio. Nine hundred thousand tons were brought into London annually at the beginning of the present century, and now more than seven million tons are annually received. No wonder that washing is such an expensive item in London, and that it is impossible to keep the hands clean for half an hour together.

Some few years ago a dead set was made against the tall factory chimneys which threw out their long pennons of smoke into the breeze. An Act was passed compelling manufacturers to consume their smoke, under a penalty which increased on a second conviction to ten pounds, and went on doubling as the offence was repeated. Upwards of seven thousand chimneys come under the operations of this Act in the parishes of Bermondsey, Southwark, Lambeth, and Rotherhithe. The apparatus they use is a furnace supplied with furnace bars which revolve and carry the small coal with which they are supplied under the fire—the furnace, in other words, is stoked from beneath instead of upon the top; the consequence is, that the smoke has to ascend through the red-hot mass, and every particle is consumed before it has passed through it. You may watch one of these tall factory chimneys a long time before you see any smoke issuing from its top. But what are seven thousand factory chimneys amid such a host of domestic chimneys which smoke away merrily at all times without fear of Acts of Parliament? It is in vain to hope for a clear atmosphere until those shall also consume their own smoke. Of what use is the attempt to revive the use of colour in our architecture until the smuts that settle upon every surface are burned before they can make their escape? The old Guildhall in the City some few months ago was rejuvenated with wall paintings, and other bright mural decorations; the passer-by scarcely knew the old building, it was so bright. It is gradually toning down, however, to the level of the prevailing sad-coloured hue, and in a year's time no one will believe it ever boasted the adornments of ceramic art. Look, again, at the adornments under the arcades of the Exchange, once so bright from the pencil of Mr. Sang; what are they like now? Our architects were in hopes that gilding would, at least, resist the impurities of the atmosphere, from the non-oxydisable qualities of gold; but, if these gildings do not oxydise, they speedily become covered with a coating of blacks, which do the work of spoliation more effectually than any mere oxydation.

The amount of soot given off by our domestic fires may be inferred from the quantity arrested, in its flight upwards, by the sides of the chimneys. The cook tells us that, unless her chimney is swept once a month, "those horrid blacks will spoil all her dishes," and what is more, the soot will catch fire; and then there is so much for the first fire-engine, and so much for the second, and so much for the informer for giving notice, to say nothing of the damage done in putting it out.

If our grate manufacturers could accompl
problem of giving us a stove that would
own smoke as effectually as the manu
naces do, an enormous gain would
as well as the beauty of

attempts have been made, none of which have been thoroughly successful without destroying the cheerful aspect of the blazing, open coal fire which the Englishman is unwilling to give up for the sake of any machinery or stove, however well it may fulfil the conditions needed. We shall never come to the Parisian stove, which gives heat merely, without showing us the light and play of the fire. Let us hope, however, that science will at last rescue the town from the dominion of soot. We cannot see the many fine buildings that are arising on every hand, splendidly embellished with the most delicate carving, without regretting that so much skill is destined to be clogged and destroyed by the incrustations of coal that is costing us two pounds a ton. London bids fair to become one of the best-built cities in Europe, if we could only exorcise this demon of soot. In the morning, before the fires are lit, the air is bright and pure, and "commends itself nimbly to the senses." This is proof enough that Nature does not treat us unkindly. It is our art and science which is at fault. A November city fog ought to be looked upon as a bitter reproach to us—as a horrid compound of our own making, which is a disgrace to the age and a standing specimen of extravagance and waste which the elements expose to our senses in the most repulsive form, as if to shame us and compel us to take some measures for its reformation. Those who live out of town, and return to it every morning, must feel as though they were living in two totally different climates; and so they are, the one concocted by man, the other by God. What greater test of human perversity could be afforded than to pass out of a November fog into the pure air of the country, and feel purged of suicidal thoughts as if by the stroke of an enchanter's wand?

ECCENTRICITIES OF THE MENTALLY AFFLICTED.

A WRITER who favoured you last week with an article upon "Eccentricities of the Flesh," had a far wider field open to him if he had considered at the same time eccentricities of the mind. We use this title as the former title is used, but the word hardly expresses the whole truth. Eccentricity is the mild term under which we favourably disguise a much more painful word. Many of the instances quoted of the "eccentricities of the flesh" would far more properly have been put down under the title of "diseases of the flesh" —that is, if we are to consider that any prolonged departure from the normal bodily sensations of mankind may be said to constitute disease. In the same manner, many mental eccentricities are only the forerunners of very serious mental disease, and are, indeed, recognised as such by the more intelligent and honest physicians. Just as the whirling straws in the road are the forerunners of a great storm, so some odd symptom will often indicate the approach of a terrible mental overthrow. Doctor Gregory, of Edinburgh, in his lectures, gave the following remarkable case in point. A gentleman, he tells us, came to him for his advice under the following singular circumstances. "I am in the habit," he said, "of dining at five, and exactly as the hour arrives, I am subjected to a very painful visitation. The door of the room, even when I have been weak enough to bolt it—which I have sometimes done—flies wide open; an old hag, like those who haunt the heath of Fores, enters with a frowning and incensed countenance, comes straight up to me, and, with every demonstration of spite and indignation which could characterise her who haunted the merchant Abudah in the Oriental tale, she rushes upon me, says something, but so hastily that I cannot discover the purport, and then strikes me a severe blow with her staff. I fall from my chair in a swoon, which is of longer or shorter duration. To the recurrence of this apparition I am daily subjected." The doctor, suspecting some mental illusion, we suppose, invited himself to dinner, in order to test the truth of this wonderful story. The dinner passed off very well, the doctor exercising all his colloquial powers with the idea of throwing his patient off his guard, and of passing the dread hour without his perceiving it. This hour was six, and the doctor was flattering himself that he had succeeded in diverting the mind of his friend from the expected apparition, as the hour had struck; and he was about to congratulate himself on being able to reassure the sufferer that the old woman had broken her appointment, when the gentleman all of a sudden exclaimed, "The hag comes again," and immediately swooned as he had himself described. The doctor saw at once that this terrible vision had its origin in a tendency to apoplexy, and by the free use of the lancet gave the patient an entire release from these afflicting visits. Had not the cause of these attacks been early discovered, the gentleman would in all probability have suffered paralysis, or softening of the brain, or any of the many fatal results of an undue supply of blood to the head.

In many of the more terrible lesions of the brain resulting in entire loss of intellectual power, the very smallest symptoms are often indicative of the mischief that is about to intervene. The inability to grasp a stick, the continual numbness of a finger, the loss of memory in small matters, are often indications of the approach of serious cerebral disturbance. Doctor Forbes Winslow, in his very interesting volume on obscure diseases of the brain and mind, from which we shall have occasion to draw for many curious examples illustrative of our subject, gives a most extraordinary instance of impairment of memory, which he quotes from the case-book of Doctor Graves, a Dublin physician. "An Irish farmer, in consequence of a paralytic fit, lost the power of remembering noun substantives and proper names; the extraordinary thing was that he could remember the initial letter of the words he wished to say, but no more. In order to meet this singular difficulty he constructed a dictionary, including the names of the articles he was in the habit of calling for, and also of the names of his family and servants. Thus, when he wished to speak of any of those persons or things, he turned to the initial letter, and as long as he kept his eye upon the word or name he could pronounce it, but his power to do so was lost immediately he lost the place." We do not know the ultimate history of this case, but in all probability this extraordinary symptom was as fatal as it was singular. Even the use of a wrong initial letter, if persisted in, is a symptom of mental disturbance. If you hear a man continually saying "puc" for cup, "gum" for mug, or "tufle" for flute without being aware of it, you may be pretty sure that his brain is affected. It often happens that such mistakes are made by the best of us in ordinary conversation, but we instantly become aware of the error, and correct ourselves, and this is just the difference between the sound and the unsound brain. In other cases of mental disease persons have wholly forgotten acquired languages, and reverted to their native tongue; on the other hand, it is recorded that Doctor Johnson, when he was dying, attempted in vain to repeat the Lord's Prayer in English, but did so in Latin. In the same manner certain events will slip out of the memory altogether. Doctor Prichard tells us an anecdote which proves that the brain sometimes stands still for years upon the invasion of disease, and when the attack has passed, can take up the recollection of an action just at the point at which it had left off. A farmer of New England, whilst enclosing a piece of land, happened, when he had finished his day's work, to put the beetle and wedges which he had used for splitting the timber in the hollow of a tree. That night he was seized with a mental attack which prostrated his mind for many years. At length, however, his senses were suddenly restored, when the first question he asked was whether his sons had brought in the beetle. They replied that they could not find it, fearful of bringing back a recurrence of the attack; upon which the old man got up, went straight to the hollow tree, and brought back the wedges and the ring of the beetle, the wood-work itself having rotted away. Sometimes during mental illness a patient will forget all the early events of his life, and upon recovery, lose knowledge of all late events, and recur to those of which he was previously oblivious.

Samuel Rogers the poet, towards the latter end of his long life, presented peculiarities of memory very similar to those we have related of undoubtedly diseased brains. In Earl Russell's life of the poet, he says, "In his ninetieth year his memory began to fail him in a manner that was painful to his friends. He was no longer able to relate his shortest stories, or welcome his constant companions with his usual complimentary expressions. He began to forget familiar faces, and at last forgot that he had ever been a poet." The *Edinburgh Review* tells us that, "although his impressions of long past events were as fresh as ever, he forgot the names of his relations and oldest friends whilst they were sitting with him." Pressure upon the brain by pieces of bone forced inwards by some accident, sometimes produces a complete death of the sentient being for the time, and a restoration of the mental power upon the removal of the cause. A singular example of loss of mental life occurred during the battle of the Nile, when a captain was struck on the head whilst in the act of giving orders. A portion of the skull was driven in upon the brain, and the officer at once became unconscious. In this condition he was taken home and removed to Greenwich Hospital, where he remained for fifteen months, living the life of an inanimate vegetable. Upon the operation of trephining being performed, however, his consciousness immediately returned; he rose up in his bed, and in a loud voice finished giving the order he was issuing when he was struck down.

One can understand the recovery of a man's wits in consequence of the removal of a pressure upon the brain, but unprofessional people can scarcely understand a born idiot turned into a man of ability by a blow upon the head. We have the fact, however, upon the high testimony of Dr. Pritchard. "I have been informed," he says, "on good authority, that there was some time since a family consisting of three boys, who were all considered idiots. One of them received a severe injury upon the head; from that time his faculties began to brighten, and he is now a man of good talents, and practises as a barrister;" and we may state that this is by no means a singular instance recorded in volumes on psychology of the brightening of the brains of idiots by reason of hard shocks.

One of the earliest indications of softening of the brain is often found to be a paralysis of the muscles of the face. The eyelid will drop, or the mouth will appear slightly drawn aside. A paralysis of the nerves of sensation sometimes leads to painful mistakes. A case is recorded of a gentleman who scolded his servant for having brought him a broken wine-glass at dinner. The servant, after looking at it, said it was a sound one; the master again put it to his lips, and again said there was a piece out of it. Ultimately it turned out, however, that the master was seized with paralysis of the nerves of sensation of one side of the lip, and not feeling the glass in that spot, of course concluded that it was broken. The commonest symptom of approaching paralysis is a numbness of fingers, sometimes of only one finger, or a want of power in the grasping action of the hand. We do not allude to partial attacks, which often happen to the healthiest, but to persistent loss of either power or sensation. The gait of a person is often highly indicative of some slowly proceeding cerebral mischief. A man so suffering will either fail to plant his foot down decidedly on the ground, or his foot will slip aside, or he will drag his leg. Sometimes the motions of a person suffering from incipient brain disease, as Doctor Winslow remarks, are very like those of a drunken man, and it has often happened that an individual has been charged with having thus disgraced himself, when in reality he deserved pity and commiseration, in consequence of being upon the edge of an attack of paralysis.

Sometimes morbid conditions of sight are premonitory of impending apoplexy. A singular instance in point is given by Dr. Gregory, who tells us that a sportsman one day, whilst out shooting, complained to his gamekeeper for having with him so many dogs, asking why he had brought out eight. The gamekeeper asserted that there were only four, and the gentleman, by the sense of touch having found out his mistake, immediately feeling that he was suffering from double vision, recognised the danger of his condition and went home, and was almost immediately attacked by a fit of apoplexy, in which he died.

In the general paralysis of the insane, that most terrible of all diseases, the premonitory symptoms are of the most singular character. The individual so suffering becomes boastful and extravagant in all his notions. However straitened may be his circumstances, he believes he is overflowing with riches, everything is successful with him, he can do everything better than any one else. In many instances these extravagances are the only premonitory symptom of softening of the brain—that terrible malady which gradually saps every power of mind and body, and reduces the poor sufferer to a living death.

Those who are not acquainted with the various and extraordinary phases of the mind, and derangements of the moral faculties which herald an attack of insanity, are apt to denounce that plea put forth sometimes on the behalf of prisoners at the bar. There is nothing more certain, however, to the medical man versed in mental diseases than that the perversion of the moral sense is, for a time, in many cases the only recognisable sign of an unsound condition of mind. There is one well-known form of insanity, kleptomania, which makes itself known by petty pilfering. This has become a sort of joke and a byeword, but although it is perhaps difficult to recognise it as a plea in criminal cases, it undoubtedly exists. A letter-carrier, for instance, having been suspected of stealing letters, his house was searched, and thousands of letters, many of them two or three years old, were discovered hidden away. When a man or woman of known wealth is discovered committing these petty thefts, where there can be no reason for the act, the psychological physician, upon inquiry, soon finds that the mere act of theft is only one of many symptoms which proclaim the person to be of unsound mind. A case is related by Doctor Winslow which bears upon this point exactly, and which proves that in this form of insanity a very different treatment is dealt out to the rich in comparison with that suffered by the poor. "A lady of good family and of affluent circumstances, accompanied by her maid, entered the shop of a fashionable jeweller at the West End of London. The lady, as well as other members of her family, was in the habit for years of dealing with the tradesman referred to. After examining many articles of jewellery, she left the shop without purchasing anything. Soon after her arrival at home, the master of the shop called at the house and requested an interview with the husband of the lady. This was at once complied with. He then informed him that his wife had been to his shop, and had, as he suspected, abstracted a valuable diamond bracelet. The matter was immediately investigated, and the suspicion of the tradesman proved to be correct. This unhappy episode suggested an investigation, and, to the astonishment of her husband and all the members of her family, a number of diamond rings, valuable bracelets, gold chains, &c., were found in her possession, of which no account could be given. This lady ultimately went completely out of her mind. We may state that there are several members of wealthy families at the West End who are known to labour under this form of mental disease, and whose failings are so well known to the tradesmen with whom they deal, that they are allowed to take things, as they fancy, unobserved; but an account of them being immediately sent to the family, they are either returned or paid for. Such persons, although thus painfully afflicted in a moral sense, will go on for years without showing any intellectual failing, or, indeed, without showing any particular oddity of manner, or departure from their ordinary habits of thought. In such cases the brain after death very rarely shows any perceptible departure from a healthy condition. Science is not yet subtle enough to detect the changes that must have taken place in its structure in order to bring about such a departure from the moral sense. Indeed, it may be said that the cerebral matter of many confirmed lunatics exhibits no appreciable change from the healthy brain; on the other hand, this organ has often been discovered after death to be most extensively diseased without any sign of mental disturbance having been exhibited by the person during life. Doctor O'Halloran mentions a very singular case in which a man, having suffered an injury on the head, which caused the suppuration of the skull, nearly one half the brain was discharged through the opening; nevertheless, this man, we are told, preserved his intellectual faculties until he died.

Soldiers have been known, again, to carry bullets in their brains without being much inconvenienced thereby: and, what is more, having passed through operations for their extraction, which resulted in a further injury to the cerebral mass, without permanent injury to their mental power. Possibly the reader may doubt in such cases whether there was any mental power to lose, but it by no means requires the possession of intelligence to form the ground for insanity, the development of which is compatible with a very low condition of the mental faculties. On the other hand, the clearest and highest mental powers have been maintained intact under circumstances which would have been thought fatal to the preservation of any of the senses. Doctor Wollaston, for instance, was afflicted from early age with an abnormal cerebral growth, which increased with his years, and at last attained such a size, that it pressed upon the cavities of the brain, and produced paralysis of one side of the body. Nevertheless, his reasoning powers remained perfect, and when he was struck mute from the same cause, he still was able to convince his friends, by the performance of the most abstruse calculations, that his brain was clear up to the last moments of his life. Nothing is more puzzling to the pathologist than these anomalous cases. When brain disease is impending, the special senses are often most acutely active. Doctor Elliotson relates a case in which a patient, previous to suffering an attack of hemiplegia, heard the slightest sound at the bottom of the house, and the ticking of a watch placed on a distant table when the sound was quite inaudible to any other person.

The senses of smell and touch become exaggerated in the same way. Everything will feel cold to the touch, sometimes gritty or greasy. We ourselves know a case in which a young man was always washing his hands under the idea—quite an imaginary one—that they were greasy. He died not long afterwards, from well-pronounced brain disease. Doctor Winslow says—"Prout mentions the case of a man confined in the Bicêtre, who in the depth of winter, when the thermometer stood at twenty, twenty-five, and even thirty degrees below freezing point, had such a sensation of heat in his system that he could not bear a single blanket, but remained seated all the night upon the frozen pavement of his cell; and scarcely was the door opened in the morning, when he ran out in his shirt and applied quantities of snow to his chest, and allowed it to melt with a delight like that experienced by persons when breathing cool air in the dog days." In others, the sense of smell is augmented in an extraordinary degree, and also perverted. Some persons, on the eve of an attack of insanity, will protest that their insides are putrid, and that the smell arising therefrom is intolerable to them. The touch, in the same manner, is often vitiated. Doctor Simpson, of Edinburgh, in describing the incipient symptoms of general paralysis, says that patients complain of their fingers feeling like sausages. A tailor who died of this disease, for twelve months previous to any suspicion of this malady coming on, could not feel the tips of his fingers, and consequently could not use his needle. It is a well-known fact that some lunatics, on the approach of a paroxysm, feel, on the other hand, an irritation about the ends of the fingers which leads them to bite their nails.

The warnings, in short, of the approach of mental disease are very numerous, and would be very valuable if they were known in time, but to the patients themselves they always appear trivial. Indeed, many of the symptoms are very similar to those that we experience in health, the real difference consisting in the persistency with which they remain, where real disease of the brain is involved. Thus, the change, without any apparent cause, which takes place in the habits of persons may be looked upon as singularly indicative of mental disturbance. It has been well remarked by a popular physician—Doctor Andrew Combe—that it is the prolonged departure, without any adequate external cause, from the state of feeling and mode of thinking usual to the individual when in health, which is the true feature of disorder in mind; and the degree in which this disorder ought to be held to constitute insanity, is a question of another kind, and which we can scarcely hope for unanimity of sentiment upon.

There are, it is true, fleeting attacks of despondency which, for a time, reduce the patient's mind to a condition of melancholia. The stomach, in such cases, is mainly in fault, and the spirits are relieved by a simple dose of medicine. There is an anecdote told respecting Voltaire and an Englishman which admirably illustrates this point. The two, in conversation, having exaggerated their own feelings with respect to the miseries of life, and the ennui that at times overtook them, agreed that life was not worth having, and made an appointment to commit suicide together on an appointed day. The Englishman came to his appointment, armed with the instruments of destruction; but Voltaire seemed to be no longer in the suicidal mood, and upon the other urging upon him the completion of their project, the Frenchman held back: "I beg your pardon, sir; but a little medical treatment this morning has entirely changed my ideas on that subject."

There are other attacks, again, whose early symptoms are so extraordinary that no discrimination or medical knowledge is needed to decide the question of the person's condition. There is such a thing as insanity of the muscles, of which Saint Vitus's Dance is a well-known example. In this condition the will has no power of directing the actions of the limbs. The mistakes poor invalids thus afflicted are constantly committing are so odd, that they are provocative of laughter rather than of commiseration. Their legs and their arms fly out in all directions; their faces, when they would look grave, put on the oddest grimaces. In short, it seems as though a demon were in possession, distorting every action, and forcing the unhappy individual to make contortions against his wish; for in this disease it is clearly against his will that his body rebels, the mind remaining clear and untouched.

In some cases the physical spasm continues constant in one direction. Doctor Abercrombie gives the case of a lady who seemed to be imitating the action of a salmon at a salmon leap. She would occasionally double her body up, and with a convulsive spring throw herself from the floor to the top of a wardrobe full five feet high. This fit would only last a certain time. Then she would rotate her head from side to side for weeks together, without showing any sign of fatigue. The propensity to gyrate has, in some cases, been known to extend to the whole body, the patient rapidly whirling round for a month together continuously. In such cases there was undoubtedly brain disease of a severe character, implicating, most probably, the co-ordinating power of the muscles.

A still more extraordinary case is on record of a girl who was continually attempting to stand on her head with her legs perpendicularly in the air, continuing this ludicrous action fifteen times in the minute for fifteen hours in the day. The labour incurred by these singular muscular actions would have exhausted half-a-dozen strong men, yet this delicate girl bore up against them for months without apparent exhaustion.

WRECKS AND WRECKERS ON THE ENGLISH COAST.

In a great mercantile country like England, possessing a dangerous coast, and seas dotted with hidden sands and shoals, a large number of shipwrecks may be inevitably looked for in the course of the year. Those that attract the attention of the world through the publicity of the newspaper press are but a very small portion of the number which really occur. Either a vessel must be of some considerable size, or the wreck must have been attended with much suffering or loss of life, to attract the attention of the busy multitude. But the simple plan of publishing a Wreck Chart annually, at once brings home to any person who sees it the real magnitude of the danger that awaits the mariner trading to our shores. The map of Great Britain and Ireland, which does duty for this disastrous chart, presents the most extraordinary appearance. Upon opening it, our island appears as though ornamented with a fringe of dots, in some places deep and thick, in others more sparsely distributed. Each dot, we are informed, represents either some total wreck, or some casualty to a vessel. The Wreck

Chart for the year 1866, thus dismally adorned, is now before us. The eye immediately detects the fact that the thickest fringe of disaster is to be met with on the eastern shore of this island, especially on the seaboard opposite Yarmouth, where dangerous sands lie like a hidden sea-monster, annually demanding as his meal a tribute of goodly ships, together with their crews. The north and south forelands are the next spots most fatally indicated as the sites of marine disaster; but the whole coast, from the Frith of Forth to Beachy Head, is more or less strewn with dismal wrecks. This unfortunate supremacy of the eastern coast of England is due quite as much to the miserable overladen vessels that skirt its shores, as to the dangerous nature of the navigation. When we sit at home at ease, and contemplate the cheerful fire, we little think of the danger its transport has been liable to from water. The coal trade of this country employs a fleet larger than that of half-a-dozen foreign navies. Possibly, little short of two hundred thousand vessels, mostly colliers, traverse this seaboard every year; and we have only to look at the miserable build of this class of vessel, and, if we know anything of the sea, to note their still more miserable equipment, to cease wondering that an autumn gale catching them, as it often does, laden almost to the water-line, is sure to send a large per-centage of them either on shore or to the bottom. Some of these vessels are very old; but we are informed that a coaster not more than twenty-five or thirty years of age, is often so rotten that she goes to pieces immediately she touches the shore, without giving her crew the chance even of getting out her boats. Out of the total of two thousand eight hundred and eighty-nine vessels lost or damaged in 1866, the fatal east coast is accountable for nine hundred and fifty-three, or more than one-third, and of this number eight hundred and fifty-five were colliers. Well might it be said that this class of vessel is little better than a floating coffin, and we can only wonder that mariners can be found to endanger their lives in such craft.* The south coast, extending from Dungeness to the Lizard, is comparatively safe, only numbering two hundred and seventy-four casualties, and of this number the greater proportion occurred off Torbay and the Land's End. The west coast, which feels all the fury of Atlantic gales, is debited with four hundred and twelve disasters, the Irish coast with one hundred and forty-four, the north-west coast of Scotland with forty-seven, and the outlying islands with thirty. In these wrecks and casualties, notwithstanding the excellence of our lifeboat service, eight hundred and ninety-six lives were lost.

The number of persons visiting our shores annually may be roughly calculated at half a million. This number of deaths from shipwreck might, therefore, appear not to be large; but when we are told that half the wrecks are caused either by wilful parsimony or sheer neglect—in other words, in consequence of the vessels being overladen or unseaworthy, chiefly of the collier class—there is every reason to deplore such an unnecessary loss of useful life. Whilst a ship's age is a very good reason to account for her liability to be wrecked, the general reader will be at a loss to account for the large number of nearly new ships that are damaged. During the last eight years, for instance, eleven hundred and thirty-five casualties happened to newly-built vessels. Possibly some of these were laid down purposely to be lost, as we shall presently show. On the other hand, there are some vessels that appear to have a charmed life—for instance, there are eight that have been afloat from ninety to one hundred years, and four that are one hundred and one years old and upwards.

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* As this article was written long previously to the crusade undertaken against villainous shipowners by Mr. Plimsoll, the necessity for Government interference called for by him, it will be seen, was not unnecessary.

The annual loss to this country from wrecks is roughly calculated to amount to nearly two million pounds a year—a very large sum, accustomed as we are to deal in big figures. In the opinion of those best able to form a judgment on such matters, marine insurance is answerable for a large proportion of this loss. The shipowner knows that, whatever may happen to his ships, he is guaranteed against loss, hence a premium is held out to him to take as little care as possible in fitting them out and in providing them with efficient stores. Moreover, according to the present terms of insurance, a captain is often led to convert a mere casualty happening to his ship into a total loss. If, for instance, he manages to wreck his ship totally, his owner gets the benefit of the whole amount of insurance effected upon her; but if, on the other hand, the captain only runs her aground, and is seaman enough to get her off again, the owner has to bear one-third part of the costs of repairs. Under these circumstances, can it be wondered at that many captains have orders, in case of a ship striking, to leave her to her fate? This arrangement is surely a direct premium on fraud, which ought to be remedied in some manner. It is even asserted that it would be a saving to the community of insurers were they to pay the whole insurance whether a ship was got off or not, inasmuch as the captain's affection for his vessel would always lead him to do his utmost to save her, if he felt assured that his exertions would not lead to a pecuniary loss on the part of the owner. We have said that many new ships are built for the purpose of being lost. This fact is patent in America, where the Florida Reef is at hand for the purposes of the dishonest skipper. To run a ship deliberately upon a reef for the purpose of making money is not only a piece of demoniacal villainy, inasmuch as the lives of the sailors are thereby endangered, but it is a most expensive fraud, for the reason that the insurer not only loses the value of the ship, but also has to pay for the valuables falsely assumed to be on board at the time of the wreck. A trial that took place some years since, at the instance of Lloyd's agents, affords a telling instance of the manner in which these frauds are worked. The vessel in question was the *H. T. Seaward*, an American ship, reported by her captain to have been lost off Loochoo on a voyage to Shanghai. Among the cargo said to have been lost were fifty thousand Carolus dollars—a currency very popular in China. Fifty thousand was, however, so large a number that the agents of Lloyd's were instructed to make inquiries of the money-changers, who confidently asserted that not a tenth part of that number existed in China. Inquiry was of course made into the nature of the wreck, and it was found that the sailors, suspecting some foul play, visited the wreck after the captain's departure, and found that the ship had been scuttled, and, what was more to the purpose, they found the very boxes, in which the dollars were said to have been put on board, contained nothing but nails and leaden bullets. Of course this inquiry got wind, and the insurers of the vessel thought it prudent not to push their claim. In all probability, the wreckers of the present day are to be found on board the vessels that are lost, but it was the profession of a large class of seafaring people on the coast of Cornwall within the present century; and, indeed, not more than a year or two ago it was reported that some demons in the shape of men were in the habit of holding out false lights in the neighbourhood of Filey, in Yorkshire, for the purpose of luring vessels to destruction upon that dangerous part of the coast. Minor villainies are known to have been perpetrated by the hardy pilots in the Downs. For instance, they were in the habit of persuading captains to slip their cables in gales of wind that by no means warranted such a procedure; the object being to force them to provide themselves with new ones from the chain and anchor-makers of the ports at hand, with whom the pilots had a secret understanding. The French have been lately saying that our salvors of property on our coasts are little better than wreckers under another name.

There are many sources of danger to ships on the broad ocean besides those wilfully brought about by the agency of men. Among these may be mentioned currents which take vessels far out of their reckoning, water-logged ships, defective compasses, and imperfectly lit lighthouses, and last, but happily least of late years, lightning. It would be imagined that, considering the vast amount of our merchant marine, we should be foremost in all matters concerning the lighting of our headlands and sunken rocks. The land that led the way in lighting towns and streets should not be behind-hand in lighting our main channels of commerce on the home seas. But the fact is far otherwise. Our system of lighthouses is very deficient, and in this particular France has long been ahead of us. Many very important lighthouses are still lit with oil-lamp burners, and those so badly constructed that in many cases they have only served to lure ships to destruction instead of warning them of their danger. The common oil-wick is still in many places the only means of illumination. It is true, powerful lenses are constructed to concentrate the rays into a thin disc of strong light, but unfortunately our science in this direction has been a source of danger.

The *Dunbar*, sailing under the Sidney headland, after a prosperous voyage from England some years since, passed in a fog under the parallel rays of one of these reflectors, and was wrecked directly underneath the lighthouse. Had a few of the rays from this lighthouse been allowed to give a light at the foot of the headland, this noble vessel would have been saved. The French prefer the dioptric principle, by which all the light of the burner is concentrated into a few occasional flashes, which can be seen through the thickest weather, and which cannot well be mistaken for the powerful lights which many steamers now carry—a difficulty which often creates a confusion and loss on our own shores where the old fixed lights might easily be confounded with them. Indeed, many wrecks have taken place in St. George's Channel through this very cause. Many powerful burners, on an entirely new principle, have been proposed, but we are not aware if they have been put to any practical use. The magneto-electric light appears to be the most powerful agent, but there are many difficulties in its application to the purpose. When we see in the nursery such a splendid light yielded by children in play with magnesium wire, at a trifling price, it does seem strange that science should still permit a single oil-lamp to burn upon our coasts. It is a singular fact, but one nevertheless true, that the sites of our lighthouses are marked with many of the ominous black dots on the Wreck Chart which denote the wrecks that have taken place there. The reason is only too apparent. Ships on their homeward voyage make for the lighthouses as guides to take them into port, and, missing the danger, by reason of the scientific error we have before pointed out, go on the rocks and are hopelessly lost.

Mr. Herbert, of the Trinity House, some years since noting these singular marine disasters, proposed to light up the mid-channel, where there is a fair way, by means of floating light-towers. Eight of these, stretching from over forty miles south-west of Scilly to Dungeness, would, in the darkest night, show a safe road up channel, a light-tower at each station yielding a strong light near the water, at no time more than twenty miles distant. The idea seems an admirable one. If it is necessary to light Regent Street at night, how much more necessary to provide some guide for the mariner through the dangers which await his frail bark in the great ocean thoroughfare, in the long winter nights. These floating light-posts would light a ship on her way without the slightest difficulty. Moreover, Mr. Herbert proposed that the outermost of these lights should be put in telegraphic communication with the seaports, by which means merchants would be made aware of the arrival of their vessels a day earlier than they now are. Besides the dangers to vessels from sunken rocks and sand-banks, there are those arising from derelict, or water-logged timber ships, from which their crews have escaped, and left as floating dangers to passing ships in the night. Many a vessel that has sailed forth into the Atlantic has met her fate by collision with these water-logged ships, which are generally to be met with in that ocean. Some of those derelicts have been known to have floated about the Atlantic for months, in the track of outward-bound vessels, and yielding evident signs of having come in contact with them. In a collision of this kind, the fate of the opposing vessels must have been sealed. Another source of wrecks arises from either defective compasses, or their deviation in consequence of the magnetic attraction of iron concealed near the binnacle. The loss of the *Reliance,* East Indiaman, near Ambleteuse, on the French coast, not many years since, is a case in point. It is known that this noble ship had an immense iron tank on board, which must have strongly influenced her compass. In many vessels this guide to the mariner in the pathless ocean is permanently placed close to the masses of iron which secure the steering-wheel, or to some other mass of iron in the ship's frame-work. Many otherwise intelligent persons believe that when iron is covered over it ceases to have any magnetic influence; and acting upon this belief, captains have thought it was quite a sufficient precaution to cover over with a sheet of tarpaulin a cargo of iron in the hold of the vessel. In such a case the compass is worse than useless, inasmuch as its supposed truthfulness is sure to lead to very serious error in the ship's course, and therefore is likely to lead to her destruction. Now that iron is displacing timber as a ship-building material, the danger from this source of error will become every day more apparent, and merchant-vessels, like our iron-clads, will be forced to "swing," before proceeding upon a voyage, for the adjustment of their compasses.

The shifting of sands is undoubtedly the cause of many shipwrecks. Many of the better known of these banks have moved within these few years. The dread Goodwin is reported to shift, but all our surveys of this sand deny the fact. Many of the small sands off the mouth of the Thames are continually changing, in consequence of the change of the current of the river, but the danger from this source is in a measure obviated by the very complete manner in which the various channels through them are buoyed by the authorities of the Trinity House.

Science has abolished, in our navy at least, one source of marine disaster, especially to ships sailing in tropical latitudes—we allude to the dangers from lightning. In the early part of the century no less than sixty ships of the Royal Navy were struck by the electric fluid during a period of six years. Some of the largest ships in the merchant marine were totally destroyed by fire through the same cause, before the application of Sir Snow Harris's lightning-conductor. Since this scientific appliance has been introduced into the navy, no vessel has suffered from the electric fluid. This great protector is far from being generally used in the merchant marine. The larger vessels are generally fitted with conductors, but few of the smaller craft ever avail themselves of this invaluable invention. Possibly the inferior elevation of the masts—the conductors of the electric fluid—renders them safer than the larger vessels, whose mainmasts often tower a hundred and fifty feet into the clouds. We alluded at the beginning of this article to the fact of ocean currents being a very common cause of wrecks. The great ocean current known as the Gulf Stream takes its rise in the Gulf of Mexico—which may be likened to a large boiler, heating the waters of the Caribbean Sea—from whence the Gulf Stream pours northward along the shores of America, and eastward across the Atlantic, until it reaches Europe, where one branch of the stream proceeds northward to the shores of Norway, and another turns off in a south-easterly direction to the Bay of Biscay. The Gulf Stream, which sailors call the "weather breeder," raises the temperature of the atmosphere resting above it many degrees, and it is supposed that the difference of temperature thus produced, especially in the winter, is the cause of the dreadful hurricanes that take place among the West India Islands. Another phenomenon, equally strange, is brought about by this singular Gulf Stream. The icebergs which issue from the Polar Seas in the spring, move southward until they come into the open waters of the Atlantic in about parallel forty-three, where they are caught, as Professor Maury tells us, by the great bend in the stream which occurs about this point. Here they congregate in great numbers, and, in his belief, have been the cause of the foundering of many noble vessels. We may state that mariners are now acquainted with the direction of this vast stream of warm water most intimately through the labours of the late Captain Washington of the Royal Navy, whose Bottle Chart has done such service to hydrography. For years masters of vessels of the Royal Navy were enjoined to heave overboard bottles when they had arrived in a certain latitude of the Gulf Stream, with the date at which they were sent adrift enclosed within them. A careful chart has been kept of all these messengers from the sea, denoting the spots on which they have been thrown ashore. By this means the stream has been made to tell the course it has kept, and in some measure the rate at which it has travelled.

On the North-eastern coast it is quite clear that harbours of refuge are the great want, to rescue the fleet of colliers from the effects of sudden storms. There is a short stretch of coast not extending more than seventy miles—namely, from Flamborough Head to the Tyne—where one-third of the whole number of casualties at sea upon our shores occur. Here we must have harbours of refuge, into which the heavily laden colliers can run, upon the coming on of a gale. When such refuges are opened we may expect to find the number of our wrecks decreasing. As it is, we are glad to find that in proportion to the vast increase in our commerce, the number of wrecks have vastly diminished, though collisions have been on the increase. It is said that these latter are owing to the increased employment of steam-vessels, the lights which they carry often misleading each other. Of late steamers have carried coloured side-lights; this in some measure obviates the latter danger, and collisions are again beginning to fall in number.

The services of the National Lifeboat Institution, as purely a philanthropic association as there is in existence, might be put in the scale against the villainies of the wreckers and hovellers, who live by preying upon vessels in distress. During the year 1866, to the 30th of September, they saved nine hundred and seventeen lives in their lifeboats, and seven hundred and sixty-three in shore-boats, making a total of one thousand six hundred and eighty. Those who have experienced the horrors of shipwreck need not be reminded of the value of this merciful institution to the poor mariner, who at any moment is in danger of perishing by the most miserable of deaths. To us the establishment of a lifeboat on a dangerous coast seems to be the most practical method of giving thanks to God for some mercy received. There is but little scope left in these sober times for the display of heroism, but here is one field at least in which it can be, and is, put in practice almost every night of the long winter upon these shores. The stories of rescue given in the little journal the *Lifeboat*, belonging to the institution, are enough to make every Englishman's heart beat, for they show that our hardy mariners have lost none of their gallantry and daring, and that the same spirit that makes the victorious soldier, animates our countrymen to perform acts of daring in saving life. What, again, must be the feelings of the donor of a lifeboat when he reads some morning in the newspaper that he has been the instrument in rescuing a crowd of emigrants from a watery grave? that a simple gift of money has been the means of saving scores of people from the last agony human nature is liable to, and to know that his charity has been given without the possibility of its being in any way abused? A person giving a lifeboat, with her equipments, is allowed the privilege of naming her. We can imagine no more soothing method of assuaging some past sorrow, than that of naming some gallant lifeboat after a departed dear one. Every time such a craft went through the raging sea on her errand of mercy, it might well seem to the giver as if the spirit of the departed yet struggled in the service of poor suffering humanity.

THE HAIR MARKETS OF EUROPE, AND FASHIONS IN HAIR-DRESSING.

When, in any fashionable promenade, we watch the mob of fair women with those wen-like appendages which destroy all the symmetry of the head, the idea that naturally occurs to us is, where does all the hair come from with which our fashionable beauties are adorned? If one woman possesses a chignon of portentous proportions, what other woman has been despoiled to furnish it forth? If another charmer passes by with an auburn "heart-breaker" coquettishly thrown over her shoulder that does not quite match her own tresses, we may be sure that there must have been a "rape of the lock" of modern date. When vanity is made to sport in a superabundance of flowing locks, where are we to seek the "miserables" from whose heads they have been ravished?

Such were our thoughts the other day as we watched the lop-sided coiffures of the fair promenaders in the Park. It is certainly a startling reflection that half Europe is dressed in the hair of the other half—that the charming Mary owes half her beauty to some red-legged Scandinavian Olga, who never even heard of

Almack's, or that whilst we are admiring the silken tresses Beatrice so gracefully sports, the head upon which they have grown is bowed perhaps in sorrow at the foot of the convent cross. The commercial transactions that must take place in these treasures of Vanity Fair can be of no ordinary kind, and of no mean value.

When we are told that locks of a fashionable colour are nearly as valuable as gold, weight for weight, the wonder is that Spring-heeled Jack—whose prominent trick some years ago was to cut off young women's back hair—is not heard of again. The supply of black hair is more easily accounted for than that of the highly-prized golden tints. The majority of it comes, we are told, from Brittany and the south of France, and the ease with which young girls part with it is accounted for on very rational principles. In Brittany a very quaint and becoming cap is universally worn by the women, young and old, which all travellers in that part must have noticed. This head-dress so completely covers the head that the hair cannot be seen; hence the hair merchant finds here a fine field for his operations. Mr. Trollope, travelling through Brittany, gives a most interesting description of the shearing of a whole fair full of people. The young girls, he tells us, stood in a row with their caps off and their long back hair combed out ready for the man who operated. Each peasant-girl as she advanced was shorn, the lock tied up into a knot, and thrown into a large basket; in this manner the whole number submitted to be shorn like so many sheep, parting from what is considered their "glory" by other women without a pang, and for a few sous. The hair is particularly fine, and is very long, hence the collectors must make an immense profit by the transaction. As all the southern countries of Europe are dark-haired and Catholic, the reader may conjecture another source from which black locks are derived. The cloister sends its contingent to supply the requirements of the fashionable world. Every nun delivers up her locks as a sacrifice, and fashionable women immediately take possession of it to use it, if we are not too uncharitable, as a snare—so diverse are the motives of human nature.

Brown hair, which is the most universal colour in the great European states, is consequently supplied in the largest quantities. Now that it has become so valuable, there are strong motives for its abstraction from the most objectionable and repulsive sources. Besides those named, we have no manner of doubt ourselves that in all cases of fever the hair shaved off for the purposes of health passes once more into the hands of the barber, and very possibly becomes a fresh centre of contagion. It would be well for the interests of the community that in all such cases it should be burnt in the presence of witnesses. There is still another source of supply, very repulsive to our nature: that mysterious woman whom in life we never recognise, but who pays the last offices to us all, is sometimes guilty of despoiling the dead in this infamous manner. We never look at a chignon, or on one of those long locks displayed so triumphantly in the hairdresser's windows, without wondering from which of these sources they may possibly have come. Not many years ago it was the custom to cut off the hair of pauper women when they entered the workhouse; but this practice, which was illegal and very cruel, has been for some time discontinued; but the rule is carried out inexorably with all prisoners, not excepting those suffering for political causes. These may be called the domestic sources of supply to the hair market, scarcely any of which, we should say, is consigned to the great emporium for this article, which is Paris. Towards this centre hundreds of tons find their way every year, and is there made up to suit the requirements of fashion, and is thence redistributed over Europe.

In a late Paris Exhibition, in the Neapolitan department devoted to human hair, there was a very curious case, exhibiting the processes by which what is termed "chiffonnier's hair" is prepared for ornamental purposes. This hair, it may be stated, appears with its root intact —in other words, it has clearly been torn from the head by violence. When first it came into the market, much speculation existed among the hair merchants as to the source from whence it had come. That it had been obtained by violence was evident; but it soon appeared that the violence was exercised by its own owners—in other words, these pieces of hair were neither more nor less than the clearings of the comb at the toilet-table. These, in Continental cities, find their way into the streets—there are no dust-bins there—whence they are collected by the chiffoniers, and sold to the hair merchants. A writer in the *Hairdresser's Journal,* speaking of the singular exhibition of the little knots of toilet hair he found in one of the cases, says:—"The first process to which the manufacturer submits them is to sort them into colours; and here I find them divided into some eight or nine separate colours, of which the dark most decidedly predominates, thus showing the Italian climate. The second process is to disentangle these masses of hair by carding them. . . . They are now submitted to the fourth operation—a secret, I presume, to the Italian manufacturer—that of turning, or, in plain words, putting all the hairs with the roots at one end. The whole process is interesting, as exhibiting the manufacture of an article that has always been surrounded with doubt and suspicion;" and we may add that it affords a singular example of the care with which every scrap of hair, day by day growing more valuable in the markets of Europe, is collected and returned to human heads if not from those whence they originally came. Among the peasantry of our own country it would be considered most unlucky to throw away such scraps of hair; it is the universal practice to collect them and burn them. A writer in *Notes and Queries* says that they imagine that, if left about, the birds would build their nests with it: a fatal thing for him or her from whose heads it had fallen, the belief being that if a pyet (*Anglice,* magpie) should get hold of it for the purpose of building a nest—not an unlikely thing, considering the thievish nature of the bird—the person from whom it had fallen would be sure to die within the year.

And now for a few words in conclusion respecting those abominations called chignons. We have spoken, in our former paper, of the false alarm created respecting the parasites termed gregarines that have been said to be found in them. Anyone who knows anything about human hair, knows that immediately upon death everything like animal life immediately escapes from it. The hair dealers have never seen life in any animal form among the large quantities that pass through their hands. Vegetable growths, no doubt, exist; but when we hear the "chignon fungus" spoken of in the *Lancet*, we cannot help laughing, as it must be quite clear that the form the manufactured hair takes can have nothing whatever to do with the nature of the growth of the parasite.

It will perhaps surprise our readers to be told that the chignon was known by that name nearly a hundred years ago. The *Hairdressers' Journal* makes the following quotation from a book on hairdressing bearing date 1782:—"Those ladies who are obliged to wear false hair, I would inform them that the greatest difficulty attending it is the putting it on properly. . . . Now to put on: and first the false chignon. I have before said where this is to be placed, but if it is not made very flat and strong with a good small comb, it will make the head appear bumpy and awkward behind." In these words the ugliest of all fashionable adornments of the head is most clearly identified both by name and nature, and it is only another proof that, as in architecture so in the coiffure, we go back to the past for our styles and fashions—a hundred years is only a modern revival, indeed. Is there not a wig in the British Museum very like the present fashion, which is at least two thousand years old?

The very golden hair so beloved by the poets and painters of old, is rising in value every day, and we are really puzzled to know from what source it is obtained: speaking generally, the major portion of it comes from the northern parts of Europe, where this coloured hair, or rather light hair, greatly predominates. The only southern country that seems to possess it is Venice, or rather it did in the time of the great artists of the past. Giorgione and Titian rarely painted a female head of another colour; Rubens, still later, indulged in this colour, but in this he merely copied the fair locks of the Flemings, who are still famous for the beauty of their golden hair. We do not know if in Venice the same hair is still to be found, or whether, it having possibly been a foreign introduction, it has not disappeared by reason of the mingling of races. The beauty of golden hair by no means depends upon its colour, its quality also far surpasses any other. It is so beautifully fine that a head of hair of this colour contains nearly twice as many individual hairs as are found in a red head. The gradation in bulk, in fact, regularly progresses from the blonde, the most delicate and flowing, to brown, black, and red—the coarsest of all hairs. The flexibility of the fair hair gives that artistic and kindly sweep which the painter loves to depict. The very yellow hair comes from the Low Countries; it is a very different thing from the saffron-tinted, disagreeable-looking colour we see in the shop-windows shown as specimens of the result of using dye. The deadness that always distinguishes these wretched attempts to produce artificially this much-coveted colour, is but too apparent. A woman must be weak indeed, or the veriest slave to fashion, who submits to these vile tricks of the hair-doctors; and when once the dyeing process has been accomplished, the man or woman is for ever after the slave of the dye. For inasmuch as the hair grows from the root, and not, like a vegetable growth, from its free extremity, of course the dye must be applied day by day, otherwise the hair next the scalp will be of a totally different colour from that on the other portion of the head. Thus the poor devotee of fashion, or of vanity, in an evil moment places his or her charms, or the counterfeit of them, completely at the mercy of the hairdresser and his worthless nostrums.

At the hair-merchants sometimes very long hair is to be met with; six feet is often attained, but such lengths as these are very valuable indeed. Grey hair is now much used for mixing with the scanty locks of the aged, for vanity in many cases journeys with us unto the end, and it is now largely employed in wig-making. There is nothing that looks more unnatural than a bright brown or jet black wig upon an old withered face; the hairdressers are beginning to see this. The weather-marks of age should be indicated in the hair as well as in the skin; this is now done by adding a few grey hairs into the dark peruque, and by changing the wig as years go by, throwing in a little more snow from time to time, the artist manages to let us down harmoniously, whilst the horrors of a bald pate are avoided. Grey hair has accordingly risen considerably in demand and in price; it is as dear now as the fashionable golden colour. In Paris, where old age seems to be a greater enemy than it is here, there are establishments where young girls are employed to pluck out grey hairs from the head and beard; but these are by no means thrown away: they fall to the lot of the perruquier, who works them up into the artful contrivances with which we hide the bare and shiny pate. The colour of the hair is wholly due to the pigment which is conveyed into it from the blood; hence the absurdity of plastering the hair with all kinds of pomatum, which only acts upon the outside of the hair. In all cases baldness and greyness are caused by an absence of this secretion. In baldness the root becomes obliterated, and of course the hair falls out; in greyness, however, there is a mere cessation of the pigment secreted. This may occur from other causes than age; sudden fear or great emotion has been known to turn people grey in the course of the night. In such cases the hair may recover its tint, although but rarely; but where greyness arises from natural decay it is vain to attempt to restore its colour, and it is equally vain to attempt to make the hair grow again when it has once fallen off from the same cause. In youth, where fever has arrested nutrition and caused it to fall off, it comes with a recovery of strength; but where the bulb of the hair has perished, all the hair restorers in the world will prove ineffectual.

In England the prevailing colour of the hair is brown. This may be ascribed to the great mixture the race has undergone by reason of the number of foreigners commerce has attracted to our shores. In London this is especially observable. In the south and west, where the Saxon element has remained undisturbed, light hair is much more common. Indeed, in Somersetshire, among the country-folk, where there has been but little change for centuries, a dark-haired peasant child is a thing to be remarked. A Bristol physician has, in fact, boldly declared that we are, day by day, getting a darker-haired people—not by reason of our greater mixture with dark-haired nations, but by reason of conjugal selection. He has asserted that, of a given number of light women he had watched, thirty-two per cent. remained single, whilst of a similar number of dark brown and black-haired women only twenty-one per cent. remained single. Now, if this state of things should be permanent—if men selected dark-haired women instead of light-haired ones—in course of time, perhaps, we should become a black-haired people. But this is a pretty theory, which our senses condemn at once. If light-haired women are looked coldly upon by the men, why are the fair so very solicitous about having light hair? If the matrimonial market inclines in the contrary direction, the mode (possibly set by the hairdressers, on account of the value of golden tresses) would not have been followed; for, much as the women like to be in the mode, they would, as a rule, rather find themselves eligible in the matrimonial market. Fashion, for once, in the matter of the colour of the hair, is right. What the poets and painters have praised, must possess the quality of beauty; and fashion, in the method of dressing the hair (always excepting chignons) is at the present moment admirable. The method of artfully adjusting it in curls over the brow adds infinite softness to the outline, and makes many an ordinary-looking face interesting, if nothing more. The same style was prevalent at the end of the last and the beginning of the present century, and that, perhaps, is the reason why English faces of that period, under the hands of Reynolds and Lawrence, looked so much more full of character and so much more "taking" than those of a year or two ago, when every woman imagined she could afford to dress her hair after the Greek method, wanting the pure lines of the Greek face. Let us trust, however, that that gross deformity the chignon, which we have evidently copied from the Chinese and Japanese, and, of course, exaggerated the mode, like barbarians as they tell us we are, will speedily fall out of favour. Why women should increase the apparent size of the head to double its real proportions whilst they have reduced their skirts to the scantiness of wet bathing clothes, is a matter so marvellous that men have given it up altogether.

In the last century the fashion was extraordinary enough. The hair was piled up a foot high, and ornamented with ribbons, and manipulated into all manner of devices. Altitude did give a certain dignity to the figure; but now the lateral extension makes us fear that the ladies will lose their balance and fall backwards. Whilst the one sex is dressing the hair so as to point obliquely behind up into the sky, the other are running all to beard in the contrary direction. Possibly there never was a time when so much hair was worn upon the human face, masculine and feminine, as now. As fashion is generally very abrupt in its changes, and goes from one extreme to the other, the time may not be far distant when a Whitechapel crop will become the mode, and we shall have to study the gentlemen on the tread-mill, and the dames picking oakum, to understand the mode in all its severity.

In Paris they have already grown tired of the passion for blonde hair, or rather the dark-haired beauties have decided that the fair hair has had its innings long enough, and have determined to give the brunettes a chance. Consequently, jet black tresses are now coming into fashion, and as the Frenchwomen are all artists in their way, they have taken to dye their skins to match: preparations of walnut-juice and chicory are now used to give fair dames an almost Eastern cast of complexion. If any man should—according to the Bristol physician's theory of natural selection—

marry one of these made-up brunettes, we may fairly ask whether, on discovering that he has been wedded by mistake to a masked blonde, he will have a fair reason for demanding a divorce. But dark or fair are by far too natural distinctions to satisfy the fair Parisiennes. We hear that some of the leaders of fashion—we suspect they must be very fast—have adopted the fashion of dyeing the hair green, mauve, and blue, as it may be, to match the colour of the dress they may be wearing at the time. We have all heard of Blue Beard, but blue locks!—the idea is too terrible; we may debit the demimonde pretty safely with the introduction of this fashion.

Anything that is very startling finds favour with this class, and it certainly is not to the credit of honest women that they submit to follow the lead of such people. In the metropolis the actresses are the true leaders of fashion. The theatre is, in fact, an invaluable means of puffing off any new style the professors of new coiffures may invent. It will, perhaps, be new to some of our readers to be told there are weekly meetings in London of a society termed La Société du Progrès de la Coiffure, at which foreigners and Englishmen assist at what is termed a grand course. Imagine, good reader, an assembly-room crowded with a barbarous—forgive the pun—company. An artist, with the politeness of the Grand Nation, leads a fair demoiselle up to the tribune, and without more ado tries all the efforts of his inventive skill in producing some sublime hirsute effect amid the rapturous applause of his fellows. Imagine the feelings of the young lady thus operated upon, and the sensation of intense jealousy with which she is often obliged to witness some other fair one experimented upon with greater applause from the spectators. As long as the arrangement of hair among women follows a particular mode, there is not much chance of judging character or disposition from the manner in which it is dressed. As long as girls will wear as much false hair as that naturally belonging to them, it would be puerile to attempt to read character or disposition in the fashion and character of the locks displayed; but viewed naturally, the hair is as great an index of temperament and disposition as the features. Mr. Creer, in his volume on hair, for instance, quotes the following indications of character founded upon the set and texture of flowing locks from a book recently published in Paris, entitled "Secrets of Beauty:"—"Coarse black hair and dark skin signify great power of character, with a tendency to sensuality. Fine black hair and dark skin indicate strength of character along with purity and goodness. Stiff, straight black hair and beard indicate a coarse, strong, rigid, straightforward character. Fine dark brown hair signifies the combination of exquisite sensibilities with great strength of character. Flat, clinging, straight hair a melancholy but extremely constant character. Harsh, upright hair is the sign of a reticent and sour spirit; a stubborn and harsh character. Coarse red hair and whiskers indicate powerful animal passions, together with a corresponding strength of character. Auburn hair with florid countenance denotes the highest order of sentiment and intensity of feeling, purity of character, with the highest capacity for enjoyment of suffering. Straight, even, smooth, and glossy hair denotes strength, harmony, and evenness of character, hearty affections, a clear head, and superior talents. Fine, silky, supple hair is the mark of a delicate and sensitive temperament, and speaks in favour of the mind and character of the owner. Crisp, curly hair indicates a hasty, somewhat impetuous and rash character. White hair denotes a lymphatic and indolent constitution;" and we may add that besides all these qualities there are chemical properties residing in the colouring matter of the hair-tube which undoubtedly have some effect upon the disposition. Thus, red-haired people are notoriously passionate. Now red hair is proved by analysis to contain a large amount of sulphur, whilst very black hair is coloured with almost pure carbon. The presence of these matters in the blood points to peculiarities of temperament and feeling which are almost universally associated with them. The very way in which the hair flows is strongly indicative of the ruling passions and inclinations, and perhaps a clever person could give a shrewd guess at the manner of a man or woman's disposition by only seeing the backs of their heads.

PROFESSIONAL BEGGARS AND TRAMPS,

AT HOME AND ON CIRCUIT.

BLUE-BOOKS are not always lively specimens of literature, but the little volume on vagrancy written by Her Majesty's Poor Law Inspectors is as amusing a volume as could well come from an official source. The beggar —the professional cadger—we have always had amongst us, and always, I suppose, shall; but of late years these fellows have become a regularly organised caste in the community. They go their circuits as regularly as the judges; they even possess maps of the counties in which they travel, and each house is ticked off with its note of warning or encouragement in the most exact manner. The hieroglyphic used is generally inscribed on the brickwork in so secret a manner that no one but the professional beggar could discover it. Mr. Hotten, the publisher of many odd books, in his slang dictionary gives a list of these hieroglyphics and the interpretation of them, which may be useful to the reader if, living in any country district—for the system is not carried out in towns—he finds odd figures marked upon his walls. Thus, a simple St. Andrew's

Cross means, "No good; too poor, and know too much." A mark of interrogation placed horizontally with a cross mark placed at right angles upon its tail is more reassuring to the tramp; it means, "Stop. If you have what they want they will buy. They are pretty fly." A mark like a tuning-fork placed at the entrance of two diverging roads, means, "Go in this direction, it is better than the other road; nothing that way." A diamond mark means, "Bone (good): safe for a cold tater if for nothing else. Cheese your patter (don't talk much here)." A triangle means, "Coopered (spoilt) by too many tramps calling here." Whilst a square means, "Gammy (unfavourable); likely to have you taken up. Mind the dog." A circle with a dot in the centre is a mark of fear, and the cadger gives the house designated a wide berth; it means, "Flummoxed (dangerous); sure of a month in quod (prison);" whilst a circle with a cross in the centre indicates that the inmates are religious, but tidy on the whole—houses that we should say had a great many callers in the itinerant way. Thus provided with a language which only themselves can understand, the tramp passes through the country with great advantage. When he obtains plenty of money by the tales he makes up and repeats in the true professional style, he never troubles the workhouse, preferring the low lodgings to be found for such vagrants in every town. But the moment his resources fail, has he not the union workhouse to fall back upon? Thus the cadger and tramp may be looked upon as a traveller, living at times in luxury upon the private benevolence of the hospitable housekeeper, and at times quartering himself upon the public purse, to which he knows he has a right legally, and claims impudently enough when occasion requires. It is concerning the tramp when he claims the hospitality of the country in his public capacity of a casual, that the very interesting Blue-book I have mentioned gives us so much curious information. The object of this report is to show that, by the present method of relieving casual paupers, the lazy and the incorrigible beggar is mixed with the deserving poor who seek help on their way from town to town in search of work. It is neither fair to the ratepayer nor to the penniless but deserving wayfarer, that these should be mixed up with men who never did a stroke of work in their lives, and never intend to do one, and this Mr. Charles Buller, whilst President of the Poor Law Board, clearly saw; and in order to remedy the defects in the Poor Law, by reason of the indiscriminate relief that obtained before his time, the following rules were issued to the masters of all workhouses:—

1. The refusal of relief to all young able-bodied men who, in the opinion of the relieving officers or the masters of workhouses, were not actually destitute.

2. The exaction of a task-work suitable to the capacity of the casual poor who were relieved.

3. The employment of police-officers as assistant relieving-officers.

4. Requiring the production of passes or certificates

(except under exceptional circumstances) from all those who applied for relief as casual poor.

These rules had an extraordinary effect upon the vagrancy of the country; especially the one which refused aid to professional tramps, such as were able-bodied, young, and in good health. It is calculated that full seventy-five per cent. of the tramps are of this class—fellows who do not deserve to receive the hospitality of the country, which was intended only for the deserving poor. The effect of these regulations was remarkable: the number of applicants fell off in an extraordinary manner. But with the death of their lamented author the old state of things was revived; and it now appears to be the case that all masters of union workhouses think they have no right to refuse relief to any applicant who alleges that he is destitute, and in whose possession there cannot be found sufficient money to pay for his lodging.

The effect of this retrogression is very sad, as it acts as a refusal of relief to the really necessitous, and as an encouragement to the professional tramp. The tramps are, in fact, the masters of the field. They take possession of their lodgings at night, as guests do at an inn, repaying with abuse every attempt to keep them in order.

Mr. Doyle, in his able report, tells us that these tramps work in gangs, and that the nicknames of at least thirty are registered, who work in Cheshire and North Wales, and who are known as the "Long gang." They tramp from union to union in pairs, and occasionally visit Liverpool to dispose of the articles they may have stolen on their travels. "It is extraordinary," says the Chief Constable of Chester, "how perfect is the system of communication among tramps. I have tested it, and found that about two days are sufficient to promulgate a new regulation among the fraternity. My first test was causing every male to be searched, and burning pipes and tobacco found upon them. Every professional tramp carries a favourite pipe, and, as a rule, has half an ounce of tobacco per day. After two or three nights, not one of the applicants had either pipe or tobacco, having hidden those luxuries before entering the police-office. The second test was searching for money, with a like result."

The tramp uses the walls of the union for the purpose of communicating information, as we have before said, to those who come after him, and especially for indicating the nature of the treatment he receives at the various unions. There appears to be a regular laureate among these fellows, who goes under the name of "Bow Street," and who has contributed a deal of wall-verse for the information of his comrades. Here is one poem, which seems very favourable to Seisdon Union at Trysall. We hope the poor-rates are not unusually heavy there; it would be but a poor return to the ratepayers to know they had such a poet in their midst:—

"Dry bread in the morning, ditto at night,
Keep up your pecker and make it all right.
Certainly the meals are paltry and mean,
But the beds are nice and clean.

Men, don't tear these bed-sheets or rugs,
For there are neither lice, fleas, or bugs,
At this clean little union at Trysall.

But still at this place there is a drawback,
And now I will put you on the right track,
For I would as soon lodge here as at Piccadilly,
If along with the bread they gave a drop of skilly,
At this clean little union at Trysall.

So I tell you again, treat this place with respect,
And instead of abusing, pray do it respect,
For to lodge here one night is certainly a treat,
At this clean little union at Trysall."

Far more frequently the legacy left behind by the tramp is less satisfactory. If he does not happen to like his treatment, he simply tears up the clothes he wears into shreds, well knowing that the master of the workhouse cannot turn him out naked. Against this move of the cunning tramp, the master has one that generally proves effectual: he dresses him up in old sacks and grimy bags, a sufficient covering to hide his nakedness, not very becoming. The most abject tramps cannot stand being made ridiculous, and they feel this treatment most acutely; indeed, we are told that out of revenge they will sometimes set fire to the next haystack they meet, preferring to be sent to prison to parading the country as such guys. If this is really the case, their toilet must be expensive. To mix indiscriminately the poor needy but honest wayfarer with such specimens of the criminal population is very undesirable. The fine tales these fellows tell of the easy life they lead, are but too apt to fall upon ground prepared, by previous privation, to receive the tares they wish to plant; and we fear that frequently the ranks of the regular tramp are recruited, in this manner, from the mere want of a proper classification in the workhouse. The handwriting on the walls such as is found here is certainly not calculated to teach any moral lesson to the inmates. Some of these choice scraps show as clearly as possible the terribly depraved nature of the professional cadger. Here are some specimens:—

Never be ashamed of cadging. I was worth five hundred pounds once, and now I am glad to cadge for a penny or a piece of bread.

Wild Scoty, the King of the Cadgers, is in Newgate, London, going to be hanged by the neck until he is dead; this is a great fact.—*Written by his Mate.*

Boys, look here; there's Long Lank working at Warrington for two or three rags of clothes, and taking the bread out of another's mouth.

The Yorkshire Rodney's coming down into Cheshire to spoil the splendid country, after filling their gutts with fine cheese and bacon.
BUTTERMILK.

Bow Street and the other raggamuffins slept here on the night of the 12th of April, and was quite shocked at the clownish impudence of the old pauper at the lodge. The old thief denied us a drink of water.

The Dutchman was here on the 21st of September, ragged and lousey, padding the hoof, and getting the mange quite fast.
THE DUTCHMAN.

Worcester Joe, Beggar Tom, longing for a flowing tin of skilley, so that we may warm our belley.

Sometimes there are some reflections in verse found scribbled on the walls, such as the following quotation from an English poet, in which the writer comforts himself with the idea that his betters enjoy the good things of this world but a very short time.

> "A little power, a little sway,
> A sunbeam on a winter's day,
> Is all the rich and mighty have
> Between the cradle and the grave."—YONKEY BEN.

As a rule, the walls are covered, however, with the names and dates of tramps, intended as notices to those they work with, where they may be found. These wall-inscriptions, in fact, serve the same purpose as visiting-cards among their betters in social life.

What the language of such ruffians is may be imagined from these written communications. Decent travellers will not spend the night with them; consequently, the money of the ratepayers is wasted in keeping afloat a wandering criminal class, who but too often are graduating here for their permanent home, the prison. Mr. Doyle, one of the most intelligent of the Poor Law Inspectors, thinks that we should return to the old plan, turning over the professional cadger to the polite attentions of the police-officers, who would speedily become acquainted with the floating vagabondage of the country, and would, indeed, act as a preventive check in some measure to their present unlimited abuse of the national benevolence, whilst the deserving poor should be received and lodged in a separate room. The old certificates of character may, he thinks, be resorted to, in order to enable the *bonâ fide* poor traveller to be passed on without question or inquiry, and to get better treatment than the professional tramp who will not work.

The wonder is not indeed that any respectable traveller should refuse to go to the workhouse unless under the direst necessity, but that the professional beggar should submit to the hard life he is obliged to put up with in such places. The vermin in the beds very often will not permit him to sleep—indeed, the absence of these nuisances is often taken as a compensation for hard fare, as we learn by the commendation of the nice "clean little union of Trysall;" but sometimes the fare is as hard as the bites of the insects, according to the ever-ready pen of "Bow Street."

"My unfortunate friends, pray look around,
And tell me for what is this place renowned?
The room is large, but the windows are small,
But that don't matter much at all at all.
A pint of skilley for your supper to drink,
But of sleep you cannot get a wink;
You may lay on the boards, or the chilly floor
About as warm as a North American shore;
The old bed is full of fleas all alive,
I killed in number about five times five.
They are not poor, but all thorough-bred,
And before morning you will wish they were all dead;
And by this and by that it plainly is clear,
This is the worst relief in all Staffordshire."

Hard fare, hard beds, hard usage—what can be the charm of the tramp's life? That he should go through so much for so little, all the time that he knows full well he could do better by the honest labour of his hands, is a puzzle beyond our power to solve. But the regular town beggar, in this respect, is even a greater enigma than his peripatetic brother of the country. What money can compensate the half-clothed sailor, who generally makes his appearance in the hardest frost without shoes to his feet, for the chronic state of frost-bite in which he must be as he paces before our windows—a shipwrecked tar perishing of cold and hunger? Again, what regular work can be so hard as that undergone by the mechanic from Manchester, who swathes up his limbs until they are no bigger than those of a boy of ten, and, posting himself on the pavement, with a canvas picture before him of some dreadful mill accident, leaves the passers-by to suspect that he is the piteous victim! When a hard living is earned by so much self-sacrifice, it is difficult to put it down as the result of mere idleness. Such fellows must often work twice as hard as the honest mechanic, and for a very uncertain remuneration. There is the street-artist again, who draws mackerel, loaves of bread, and pieces of bacon, with coloured chalks, and having laid out this sumptuous repast upon the pavement, writes under it, "I am starving." One would think that, with such skill, in such a city as London, he ought to live in clover. There must be something in the mere pleasure of getting alms, whether from a hard-hearted Poor Law overseer, or from a sympathising public, which makes up for the difficulty and degradation with which it is accomplished. Blind beggars may call forth our sympathy; but it is very questionable whether those sturdy *habitués* of the Regent Street pavement would thank any oculist for restoring them to sight.

From the Blind Beggar of Bethnal Green down to those of the present day, this class of vagrant has always flourished apace. Many live upon the fat of the land, and would thank you for nothing if you were to suggest the couching operation. We have all heard, again, of the crossing-sweeper at the Bank of England, who kept his country-house, and came down to business every morning in his cab; but this is evidently an invention on the part of some discontented speculator.

It is scarcely necessary to say that in the London unions there are no wall-inscriptions, for the reason that the tramps have other means of communicating with their friends out of doors; otherwise we might expect to find some very interesting communications, as the London workhouses are often tenanted by a superior class of inmates; but such casual paupers find it far more profitable to write what they have to say in the evening papers. What if "Bow Street" should follow the London Casual's example, and tell us the genuine story of a genuine tramp? That would be worth listening to.

OUR OLD CLOTHES, AND WHAT BECOMES OF THEM.

When we consider the quantity of clothes persons of even moderate means throw aside as too shabby to wear in the course of the year—what shabby waistcoats, shrunken woollen trousers, old socks, jerseys, &c., are gladly disposed of one way or the other, it must be evident that in the aggregate the quantity of our worn-out clothing must be enormous. It passes away from sight, and we fancy that we see it no more. But the thoughtful man naturally asks himself what becomes of it. Passing along Houndsditch the other day, I received an answer to this question by coming across the Old Clothes Exchange, where they are sold by auction. The Exchange is a court, partly open and partly covered in, the charge for entrance to which is one half-penny. Towards this centre all the old-clothesmen of London find their way day by day, with the exception of the Hebraic Sunday, and here they turn out their greasy bags, containing the old coats and other garments of our households which they have obtained by driving very hard bargains indeed. The smell is something dreadful, and the dust distressing.

It is not only woollen goods, however, that are disposed of here. Silk dresses, and fabrics of all kinds equally find their way to this centre, from which they are as speedily dispersed. There are certain dealers in certain articles. Some men buy waistcoats, some coats, &c., and to these men the progress of the auction seems to be a matter of the greatest excitement. Many of the garments here sold are converted to fresh uses. The first object of the purchaser is to see if the garment can be revived and sold once more as an article of dress. It is, therefore, carefully "clobbered" or mended, supplied with a fresh gloss, and in this improved condition is re-exported. A vast quantity of old clothes find their way across the Channel to Ireland, and this accounts for the fact we so often notice, that the Irish peasant when in ordinary dress, is always to be seen in a swallow-tailed coat of the past generation. Black clothes, if they can afford the amount of good cloth, are made into waistcoats; but even if there is only a very little that is unworn, it is purchased to be cut up and made into caps, for which there is a great market in France. To Holland, mainly, go all the old cast-off coats of the soldiers. They are there converted into under waistcoats, and used as a protection against the damp of that country, the Hollanders having a preference for red cloth for this purpose, as it is supposed to be, and indeed is, a greater absorber of heat than any other colour. The officers' coats, of course, serve many purposes before they reach Mynheer. If we go along Holywell Street we see that there are plenty of them hanging up for sale, and if we ask the salesman what becomes of them, we find that they are sold for masquerades; but many that are too much worn for that purpose, will still yield enough sound cloth to make facings for the civic officials of the northern powers. This fact I learned from a man in the trade, but I should fancy that Prussia at least, now that she has grown powerful, is above putting her servants into the cast-off finery of other nations.

All the more splendid uniforms, such, for instance, as lord mayors' liveries, beadles' coats, and the uniforms of the court flunkies, are far too valuable .to descend to such uses; we are told that they are regularly exported to the Gold Coast, where, in all probability, his sable majesty, Mumbo Jumbo, may be seen on state occasions habited in the grand great-coat, with gold and red facings, of the beadle of the Bank of England. There is a very useful person connected with this exchange, whose office careful households sometimes anticipate; these are the translators. Such persons will turn about a coat whilst it is being offered by the auctioneer, and reckon it up in a moment. The skirts, which we never in decent life wear out, will cut up into a suit for little Tommy, the silk with which it is lined will do to line caps, the other parts will make jackets, and the scraps will yet go for caps. There are female as well as male translators and revivers; these will be found searching over the female half of the market, looking over the old silk clothes, old crinolines, under-garments, &c., anxious to see what they can restore to the wardrobes of the working classes once more. Old silks cannot be made useful, as the old cotton goods are, by the paper-maker; but a purpose has at length been found for them; shredded very fine, they are used to stuff what are termed "bed improvers." Old boots and shoes, hats, &c., find their way with clothes to this central mart, and having been disposed of, are revived and sold once more. I fancy that the Old Clothes Exchange does not flourish as much as it once did, inasmuch as a new class of old clothes collectors have arisen who do more business than the dirty Polish Jews; householders were ashamed for them to be seen at their doors. I allude to the costermongers, who at certain seasons of the year turn flower-dealers, and obligingly offer to barter them for any old clothes we may possess. There are few ladies who can resist this appeal; holding up a charming fuchsia or a geranium in full bloom, he tempts our wives and our sisters with a "Any old clothes, ma'am, old dresses, boots or shoes? This splendid flower for a 'weskit,' ma'am—anything, ma'am, you want to throw away." The temptation is too great for any woman with floral tastes to withstand—wardrobes are forthwith searched, and very often clothes that are anything but worn out, are bartered for a fourpenny pot of flowers. There is something in the spirit of barter which overcomes a woman's prudence; she will gamble in this innocent manner, and get taken in, of course, as egregiously as did the Vicar of Wakefield's son when he bartered the horse for a gross of green spectacles. Nobody cares what becomes of our old dusty hats, or our old broken boots, and their resurrection in the shape of a charming flower is a thing to rejoice at; but when a man finds his second-best waistcoat is gone, and is assured it really was too shabby to wear, the appearance of the peripatetic coster at your door in the spring months is a caution. When the bargain has been more even, the gain is double: the flower is a bright and sweet reminder of the dusty refuse that was always in the way, and the old hats and boots, when revived, make many a poor man and child decent, that otherwise would have gone badly covered, head and foot. It is marvellous what can be done with an old hat by the use of a little stiffening and black dye; and the boots even, when they are too bad to serve the adult, are capable of being cut up into boots and shoes for children.

It is astonishing how cheaply the poor may, if they choose, buy clothes at these dirty sales in Houndsditch. In the women's department pence go as far as shillings in the shops, and sometimes the articles are anything but worn out; but then, of course, the price is proportionately dearer. Black silk dresses appear to be the articles most in demand, for the reason, we suppose, that the very poor imagine them to be the emblems of gentility, and hence are anxious to obtain them. Fashion is as important among the classes just above starvation as in the "beau monde." No sooner is some eccentric costume adopted by the upper ten thousand, than we see poorer maidens rampant in the same direction; hence the most fashionable garments are sought after in such second-hand emporiums as these with avidity. What become of all the old bonnets? I ask the question because, among the innumerable articles to be found in the Old Clothes Exchange I noticed no bonnets; but bonnets must be rejected in large numbers. True, at the present moment they are reduced in proportion from the towering altitude of two years ago to the dimensions of a bit of gauze the size of your hand, with the addition of a simple rose or other flower by way of ornament; but in past years the fabric was far more magnificent and complicated. We can only suppose that the bonnet is a matter which touches a woman's pride: she could not submit to wear this second-hand—like her honour, it must be spotless.

Having traced old clothing from the wardrobe to the barrow of the costermonger and the bag of the Jew, from thence to the gentler attentions of the reviver and the translator, we must still further pursue them. Re-worn by the lowest class of the population, too bad even for the beggar, broken into pieces far beyond the power of the clobberer to repair, it is yet far from becoming so poor a thing that it has reached the ultimate destination of all mundane things—the earth. Indeed, having descended as low as it possibly could in the social scale, a turn of fortune suddenly sends it up again. We have all heard of "devil's dust," which Mr. Ferrand made such an outcry about in Parliament some years ago; well, this devil's dust arose from a machine invented for the purpose of grinding up old woollen fabrics, and converting them into mungo and shoddy. Mr. Samuel Jubb, one of the largest firms in this trade at Batley, in Yorkshire, the capital of the shoddy trade, gives a very curious account of these machines. He says, "The principal part of a rag machine is the swift, or revolving cylinder, set with iron-toothed plates somewhat like doffing-plates. One of these swifts contains from ten to fourteen thousand teeth, according as it is coarse or fine; the coarser-set swifts are set to grind soft rags, viz., stockings, flannel, carpet, &c., into shoddy; the finer set-ones to tear cloth rags into mungo. . . . To the uninitiated it must be surprising to see the rags suddenly transformed into fibrous wool; and it is in this process of grinding that the apparent impossibility of making old rags into new cloth vanishes away, for those persons who are otherwise unable to form an idea how the rag is to be metamorphosed into cloth can, when it is assimilated into wool in its form and condition, at once see the solution of the supposed difficulty." To these toothed wheels there come all the cast-off clothes, not only of Englishmen, and Irishmen, and Scotchmen, but of the whole of Europe. To Batley and the surrounding towns worn-out clothes find their ultimate way, and there rise again from their ashes; and so important has become this manufacture, that this little town, which in 1841 only numbered seven thousand persons, has now doubled its population. The wool that is returned to the woollen manufacturer from these sources is equal to many millions of fleeces; and the result is, that whilst nearly every article of commerce, on account of the dearness of living, has increased in value, clothes have been for years growing cheaper. "Europe sends her cast-off gentility of moth-eaten coats, frowsy jackets, worn-out linen, offensive cotton, and old worsted stockings—this is their last destination, in a manufactured form. Reduced to filaments and greasy pulp by mighty-toothed cylinders, the much-vexed fabrics re-enter life in the most brilliant forms—from solid pilot cloth to silky mohair and glossiest tweed. Thus, the tail-coat rejected by the Irish peasant, the gaberdine too foul for the Polish beggar, are turned again to shining uses, reappearing, it may be, in the lustrous paletot of the sporting dandy, the delicate riding-habit of the Belgravian belle, or the sad sleek garment of her confessor."

We are told, indeed, that although shoddy-grinding machines are now in active work in Prussia and other countries, those countries never work them up into cloth themselves, but export all their mungo or shoddy to us. Having the command of such extensive supplies of this material, our cloth made from this refuse is much cheaper than any other cloth in the world. It is, of course, of different prices, according to the fineness, &c.; the prices ranging from one shilling to ten shillings a yard. But, says the reader, what becomes of shoddy and mungo-made cloth, of which there must ultimately be as much as there originally was of cloth made direct from the fleece? Well, then, when it is worn out in this form it is very valuable as manure. The grease it may have contracted renders it a very valuable fertiliser; when, however, it is very rich in this substance, it is put into a press and the oil is extracted from it: it is not very pleasant to smell, but it makes very good oil for lubricating machinery. Even then the pressed rag is valuable, and finds its way to the hop-grounds of Kent—two pounds of it, we are told, being of equal value to one hundred pounds of farm-yard manure, or fifteen pounds of liquid manure.

There are several kinds of material known in the trade as union fabrics—such as alpacas, coburgs, balzarines, &c.—that is, cloth made out of cotton-warp and woollen-weft. For years these materials could not be re-made up, as the one spoilt the other; latterly, however, they have been subjected to steam at a very high temperature, sufficient to destroy, or rather char the wool, but leaving the cotton untouched and fit for the purposes of the paper-maker. The wool, thus charred, is termed the ulmate of ammonia, and possesses very valuable properties as a fertiliser. The dust of wool is employed to make flock-paper, and other waste from the shoddy-making process is used to stuff mattresses.

All old cotton material, and linen also, when it is worn to rags, becomes the property of the paper-maker. The value of clothes by no means ceases, as we have shown, when they become old. The amount of wool re-introduced by the manufactures mentioned is equal to one-third of the consumption of the country. What would have become of the lower classes of our teeming population without this institution of "shoddy" it is difficult to guess. When Mr. Ferrand denounced this manufacture, amid the cheers of the retrograde party in the House, and when he denounced the manufacturers, Mr. Cobden among the number, as little better than swindlers or adulterators, he was really endeavouring to create a prejudice for political ends against one of the most ingenious processes of the age, and one which has given every poor man a new coat at a price at which, under other circumstances, he could not have purchased a second-hand one.

ARTIFICIAL LIMBS, AND THEIR MODERN IMPROVEMENTS.

If we have not, like Frankenstein, the power of creating a man, there can be no doubt that we can repair him in a very satisfactory manner. If all the people who go about with false limbs or portions of limbs, false teeth, hair, and even skin, were to rise up before us, we should be astounded at the number of damaged individuals there are moving among us apparently sound, and still further astonished at the skill and delicacy with which art has improved them. Sometimes we receive by post a little illustrated circular of some artificial limb manufacturer, and in turning over its pages it is impossible to help smiling at the odd things these tradesmen supply to build up the failing powers of poor mortality. You have possibly heard, good reader, of such things as "plumpers," and no doubt imagine they always refer to votes. Nothing of the kind; there is the elector's plumper, and the "plumper" sold by the artist who softens time's ravages, and tries—alas, how vainly!—to pass us down to the tomb with all the graces of youth. The "plumper," then, of the artificial limb-maker is an india-rubber cushion supplied to old gentlemen whose cheeks have fallen in. This is a new grace which has lately come under our attention; but there are scores of old designs which have been in use for centuries. Artificial legs and arms were known to the ancients, but it is to modern artists that we owe the refinements at present introduced into the construction of false limbs. A war may be considered as purely destructive, yet even these scourges of humanity are not without their uses; the constant destruction of limbs which goes on in a campaign puts the mechanician who constructs them upon his metal. We once heard a celebrated artificial limb-maker say, "Ah, all we want, sir, in our trade is plenty of practice; we only want a good long war to turn out limbs as good as nature. Give us plenty of orders—make it worth our while, and you would soon see what we could do."

Whether it is worth going through so much for such a result may be a question; but there can be no doubt that the Crimean war was the cause of many improvements in artificial limbs. In legs, for instance, there was a great advance made. The action of the limb is now imitated almost to the life; there are springs cunningly placed in the calf, and there are jointings at the instep which give a pliability to the understanding our ancestors never even imagined. When we look back upon the wooden legs that our old veterans were contented with, we see what an advance we have made. Sometimes, even in the present day, we see some old-fashioned fellow going about with a leg sticking out behind him at right angles, supported by a "bucket and stump" at the knee. In these days no limb-maker would permit his patient to go about so disfigured, he would recommend amputation, so as to give him a respectable straight stump to work upon. For the common people, for private soldiers and sailors, the old wooden legs—not one bit advanced in their constructive art—are served out in the military hospitals; but the officers are supplied by a grateful country with limbs of the most improved construction. This is an odd distinction to make between man and man, and it is well that Dame Nature does not draw the same class distinctions in the construction of the human machine, otherwise we scarcely know what kind of animal the poorer class would be reduced to. In the manufacture of arms the same delicacy of machinery is arrived at as with legs. False arms can be very cleverly disguised by art; they are even made to bend at the elbow, and the hands are rendered capable of holding anything by the mere touch of a spring. But the dressing-up of the arm perfectly disguises it; the well-gloved left hand is fixed across the breast with some light garment hanging over it in such a manner as to hide any appearance of awkwardness. When fingers are lost, they are cunningly supplied by artificial ones fixed on to the old stumps by means of signet rings. A certain amount of motion is given to hands by means of a cord passing through each finger, the cord being gathered into a general centre just above the wrist. Here, by touching a spring, a closing action of the whole hand is produced. Upon relaxing this cord, small springs, placed in the upper surfaces of the fingers, extend them. A celebrated artificial limb-maker, some years ago, attempted to devise a hand by concealed cords and springs, which gave some grasping force. The motive power in this case was "a small column of mercury placed in a tube within the arm part of the apparatus, the intention of which was, that upon the elbow being flexed, and the lower arm placed at an inclined plane, the gravity of the quicksilver acting upon a kind of plug to which the centre cord was attached, should at once produce a closing of the fingers." But, unfortunately, the mercury would escape notwithstanding all precautions, and as it is rather odd to find quicksilver running out of a man's finger-joints, this plan had to be given up. But if perfect action cannot be obtained in an artificial hand, a very fair copy, as far as outward appearance goes, can be obtained—nay, we are told the wearer is often so delighted with the modelling of the artificial hand as to prefer its gloved surface being seen in lieu of the remaining natural member; but nature will assert herself, and the artist who thus finds his artificial hand actually preferred to those of nature, is obliged to confess that "a regret is created by a knowledge of the impossibility of imitating, with anything approaching to exactitude, the delicate warmth and softness bestowed by nature." The mechanician can do much, but he cannot give that tender pressure to the artificial hand which the most loutish lover can do with ease. Springs are so cleverly placed in the thumbs, however, that all kinds of implements can be held with safety, and even a pen held to write, which really does seem to be a complete triumph of art.

When calves have withered, paddings are supplied, which at once transform the shrunken shank of seventy to the sturdy limb of twenty-five. Clever as the artificial limb-maker is, however, the surgeon occasionally has a job to do which beats him hollow. Sometimes a man or woman has the misfortune to lose the nose, a very indispensable ornament to the human face, which few of us care to be without. The clever surgeon in such a case, by what is termed the rhino-plastic operation, makes a new nose for the patient in this wise;—He marks out as much skin as will be sufficient to cover the nose upon the forehead, with the base uppermost; he now pares the remains of the old nose, and then carefully dissects the skin from the forehead down to the bone, leaving a small point of attachment between the brows, so as to keep up the arterial circulation; the skin is then twisted upon itself just at the brow, and fixed with ligatures to its proper situation over the old nose, oiled lint being placed in the nostrils to support the structure. In this way a new proboscis, very serviceable, if not very handsome, may be obtained—and a living nose, be it remembered, none of your artificial things that are sometimes fixed upon the face by means of a pair of spectacles: not that such artificial noses are by any means to be sneezed at. By the rhino-plastic operation, deformities of the lips, and those very ugly "pugs" to which even the most indifferent object, are often corrected.

It is the details of the face and head that vanity is most sensitive about. We care little for those portions of the body that are hidden; but the face, especially that of the lady, must be "beautiful for ever." What woman would ever submit, in a civilised country, to go without an eye? The thing is not to be done, consequently there is an important trade in artificial eyes. We see an assortment of them sometimes in the windows of the artificial limb-makers, and very cleverly they are imitated, too. They are easily inserted into the socket, and the muscles of the eyelid give proper motion. If well matched, it is difficult to discover the real from the imitation eye at a casual glance. We will not say that it can look tenderly, that it can laugh, that it can drop a tear, but it makes a good straightforward eye, not over-troubled with what are termed "speaking" qualities; moreover it has a trick of getting dusty, which does not look very natural, but it is infinitely better than an empty socket, as we all must confess.

It is not strictly correct, we admit, to speak of the hair and the complexion when discoursing upon artificial limbs, but we must be pardoned for thus travelling a little way out of the record. The dentist ranks as a professional man—indeed, all the best dentists are surgeons, as they should be, but their art is more addressed to the vanity than to the health of the community; they supply natural "plumpers" to fill out the cheeks when they may not be absolutely wanting for the purposes of digestion. The dentist can do anything with the teeth. Will art ever arrive at such perfection as to be able to supply a speaking tongue? We do not see that such a triumph of human skill may be ranked among the impossibilities. The tongue is nothing but a flexible fleshy muscle, and surely vulcanised india-rubber could take its place, imperfectly, of course. On the perfect flexibility of the artificial material employed, and upon its power of being directed to any part of the palate required would depend its power of giving articulate sound to the voice; if there were any portion of the stump of the tongue left this motion may be, to a certain extent, exercised, and the otherwise dumb may be made to speak. We make this suggestion a present to some artificial limb-maker of the future; if he should succeed, he will certainly make a great name for himself. The loss of hair has long been supplied by the wig-maker; but the wig of the old school was never intended, we suppose, to deceive people—at all events, it never did. The modern wig is so close an imitation of nature that it is simply impossible to discover the real hair from the original. Moreover, the artists in hair imitate nature in her progressive stages of decay with admirable art. Of old, if a man took to a wig, he wore the same wig to the day of his death. The face grew gradually withered, the cheeks fell in, the teeth fell out, yet the wearer retained the full crop of hair he boasted in his youth, no baldness appeared, no sprinkling of grey hair. The spectator beheld a ruin in face crowned with the locks of youth. The inexpressibly odd appearance this impossible mixture gave the face was felt rather than explained. There was neither the mellow aspect of the grave and reverend signor, nor the cheerfulness of youth. On a sudden the wig, for some reason, was laid aside, and the ruin stood confessed; a half century seemed to have passed over the man since last we saw him—nevertheless, he looked more of a man and less of a barber's dummy. The whole aspect was, in fact, harmonious, after a vain struggle to delude the fatal scytheman against whom we all struggle in vain. The modern artist in hair, as he loves to be called, follows nature—he makes the wig snow into the old winter age of life by degrees. A few grey hairs are sprinkled amid the black: in time he persuades his customer to have a fresh one, in which the iron-grey predominates; and in this manner he hands him down to a silvery whiteness without consigning him to baldness, which is not becoming to all men.

The professors who make the ladies "beautiful for ever"—what a satire is conveyed in those two words—would do well to follow the example of the artificers in hair. There is a beauty in lines, even those of a woman's face, if she would only take them kindly; but to fill up the wrinkles which time has graven, to obliterate all the tender marks our passions and affections have written there, and to put in their place so much plaster of Paris or any other composition, which transforms the living visage into a dead mask—such is the art the beautifiers boast of possessing, and we are sorry to say there are but too many who believe in their intolerable art. There are no more two complexions alike than there are two tempers. What are we to think, then, of people who make up washes by the hundred, for the purpose of giving the same red and white bloom upon the skin to all who may purchase it? What shall we say again to the trick of marking dark lines under the eyes, in order to give a touch of sadness to the face, or of touching the eyelashes with dyes to give them a raven blackness, or of sundry spirituous washes for the eyes to give them sparkle and fire? The art of the artificial limb-maker is excusable; he only restores losses which have arisen from accident or from disease. As a rule, he does not pretend to restore our lost youth, which never can return; but these beautifiers reduce life itself to a delusion and a snare. We are told that even the inside of the mouth is given over to these getters-up of female charms, whilst the lips afford a grand field for their art. Of course, such lips cannot kiss; even the affectionate salute must be foregone, after a lady is thus embellished with her "war paint."

How thankful all of us ought to be who are blessed with sound limbs, that we have not to deliberate how our artificial machinery will work before we give way to any strong emotion; or how doubly thankful those who are not ashamed to wear the becoming livery of age must be, to find that they can kiss their children without fearing that little Tommy should discover that he is covered with paint in the process, or that we can afford to laugh, without fear that our faces will crack in consequence.

HOW GENTLEMEN ARE MADE.

It is told of King James I. that, when his old nurse entreated him to make her son a gentleman, he replied that he could make "him a lord, but that it was out of his power to make him a gentleman." But what our first Stuart King found it so impossible to do Mr. Walford* does wholesale with the utmost ease. Witness this formidable volume which sweeps the three kingdoms with a net of the finest mesh, bringing in fish of all sizes and ages, some of which, had he been liberal, he would, in imitation of good fishermen, have tossed back again until they had grown older and of a more legitimate weight and size. In this country, however, the possession of land is a passion. The successful lawyer, physician, manufacturer, or merchant, after the toil of life is over, seeks to build up a family that shall flourish and hand his name down to posterity. The titled, or landed, aristocracy are recruited from these sources. New men invigorate the blood of the old families. Were it not for this arrangement, nobility would speedily die out from among us. For it must be remembered that it is not with us as with many foreign aristocracies, which transmit their titles to all their children indiscriminately. Here the grandchild of every Duke, Marquis, Earl, &c., becomes a plain untitled gentleman, falls back into the mass of Commoners, and becomes incorporated with them. It is only necessary to compare the editions of these volumes year by year to see the numbers of names that drop out in every new issue, to be as often replaced by perfectly new men. It is this constant circulation of human atoms which keeps the upper ten thousand from degenerating into a mere caste, with interests antagonistic to those of the other sections of the community. This is the best excuse for Mr. Walford's liberal admission of names that seem to push for places in his social Valhalla with a too vulgar earnestness.

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* This article appeared in the *Times* of April 1, 1869, as a review of Walford's "County Families."

It is curious to note the successive enlargements of late years with respect to the make up of our "Golden Book." The old Peerages gave only the peers; Sir B. Burke added to them to the Baronets; Dod descended to the Knights, and in this volume titled and untitled are mixed together in one alphabet. We all of us respect any name that is to be found on the roll of Battle Abbey, but it is well known to genealogists and heralds that even that noble roll was adulterated, the monks of that age having felt no more compunction of conscience at slipping in a name to please the powerful and great of the day than would the seal engraver at giving a *parvenu* any number of quarterings on his coat of arms he may be willing to pay for. We are afraid the desire to strike a deep tap-root into past ages is too tempting an occupation to be confined to any age or class. How many of our leading Peers, for instance, have managed to graft themselves on to ancient stocks? The Percy is a Smithson, Paget is a Bailey, Marlborough is a Spencer, not a Churchill; Coke, Earl of Leicester, is not a Coke, but a Roberts. The Wellesleys, were Colleys until 1728; Earl Ducie is not a Morton, but a Reynolds. We could go on with scores of names. If we take a survey of the landed gentry, and try them by even a moderate test, we shall find the list shrink up in a marvellous manner. Mr. E. P. Shirley in his *Noble and Gentle Men of England* cannot find in England and Wales above 500 real County Families, including Peers and Commoners, who have held their lands by an unbroken tenure in the male line from before the dissolution of the monasteries.

It may be asked, if this is really the case, how have they swelled into the tremendous list which Mr. Walford presents to us? The fact is, the Revolution of 1681 inaugurated a total change in our national feeling as regards heraldry, such as no fresh revolution could undo. This fact Mr. Walford has wisely acknowledged. His book, while it admits every one who has a right to be ranked among our County Families, also gives place to those who are slowly making their right good. While, however, it must be admitted that names at times appear strangely, side by side, in alphabetical arrangement, it must be remembered that, as far as noble blood is concerned, the Commoner is often of better descent than the Peer. The Scropes of Yorkshire are but Commoners, but they can show a pedigree which they believe places them in a higher position than the Earl of Shrewsbury; the Earldom of Wilts created in 1397, which they claim, and which claim is now being tried, if successful, will place Mr. Scrope in the position of Premier Earl. There are again many plain Mr. Howards who come of the Norfolk stock. Mr. Walford, in including the Commoners with the Peers in this volume, has, therefore, by no means encroached upon the privileges or social position of the latter. The Grosvenors were eminent in Normandy before the Conquest, yet 110 years ago they were not Peers, but they were none the less noble on that account. In an heraldic sense the unbroken tenure of land is the basis of true nobility; and the last of the Hampdens, who could proudly write on his tomb, "twenty-third Lord of the Manor of Hampden," needed not the honours of the Peerage to aggrandize his position. On the other hand, we have the authority of Sir B. Burke's *Vicissitudes of Families* for the knowledge that some of the proudest names of the Peerage may now find their representatives among the lower orders of the people. A descendant of the Plantagenets was a short time ago living as a labourer at Kettering. The grand old kingly name has now been shortened to Plant. The descendants of another Royal stock, the Earl of Kent, sixth son of Edward I., are to be found in very humble occupations. One was a butcher at Hales Owen—a Mr. Joseph Smart; the other, Mr. George Wilmot, kept the turnpike-gate at Cooper's-bank, near Dudley. Another descendant of a Royal line was to be found a short time since in Mr. Stephen Penny, the late sexton of St. George's, Hanover Square, who came of the blood of the Duke of Gloucester, fifth son of Edward III. There are numbers of the representatives of fallen greatness we could add to this list.

Taking into consideration the possible claims of many Commoners to Peerages, a record of their descent, such as this book from year to year affords, may be of the utmost importance in a legal point of view. For instance, if the *County Families* had been published 200 years ago, and been continued from year to year, there would have been no Shrewsbury case; for the pedigree of those Talbots who passed into the ranks of the untitled gentry would have been carefully recorded. We may add, too, that the appearance of this volume will render the trade of dealing in false arms and false pedigrees, of late so notorious, a very unprofitable business. A simple register will supersede the action of the law which in 1597 cropped one W. Dakyn's ears for so offending, and in the Percy case pasted up the Dublin trunkmaker, like one of his own trunks, with a placard denouncing his impudence in falsely claiming the Earldom of Northumberland, in which unpleasant confinement he had to stand in Westminster Hall as a warning to others.

Mr. Walford is evidently as well aware as any one of the imperfections of this voluminous work, the entry of every name in which involves a statement of from five to fifty facts, and we fully sympathise with him when he asks pardon of the public and subscribers for any *errata* which may appear. We observe a cross to too many names, denoting that he has not succeeded in obtaining from those sources returns of matters which, it is unnecessary to observe, are even more important to the owners than to the public.

What would the gossips of old have given for a book which opened to them the recesses of every County Family in the Three Kingdoms?—we will not say every recess, for here and there we observe what may be termed the "Blue Beard family cupboard," omissions which are not made evidently without very good cause. There are, for example, some awkward blanks of parentage to be found. Very many have no fathers; at all events, none such as they care to name. In some places the particulars of marriages are omitted, possibly with prudence. This work, however, will serve other purposes besides those of mere curiosity, envy, or malice. It is just the book for the lady of the house to have at hand when making up the County dinner, as it gives exactly that information which punctilious and particular people are so desirous of obtaining—the exact standing of every person in the county. To the business man, *The County Families* stands in the place of directory and biographical dictionary. The fund of information it affords respecting the upper ten thousand must give it a place in the lawyer's library ; and to the money-lender, who is so interested in finding out the difference between a gentleman and a "gent," between heirs-at-law and younger sons, Mr. Walford has been a real benefactor.

THE END.

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